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In This Issue—A Power-Farming Dealer's Business

# MOTOR AGE

Volume XXXVIII  
Number 25

PUBLISHED WEEKLY AT THE MALLERS BUILDING  
CHICAGO, DECEMBER 16, 1920

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## Wouldn't You Prefer to Sell Cars Like Hudson and Essex?

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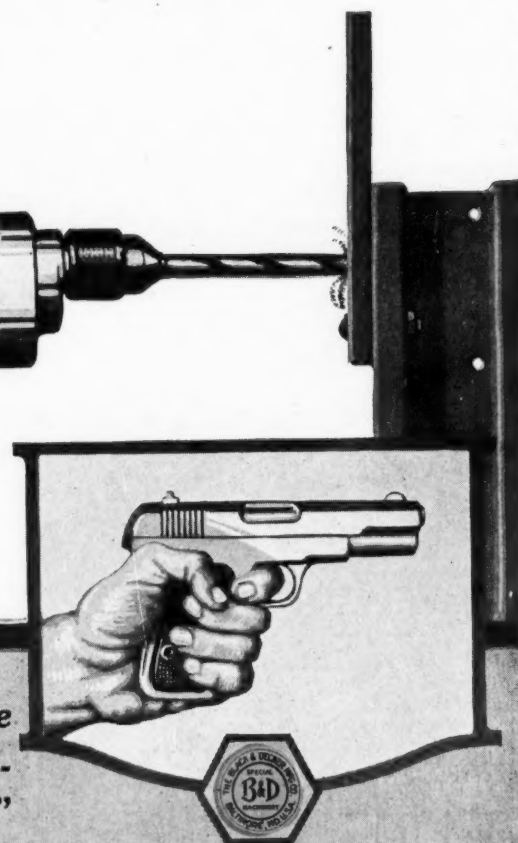
**Hudson Motor Car Company—Essex Motors**  
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# MOTOR AGE

Published Every Thursday by

THE CLASS JOURNAL COMPANY

MALLERS BUILDING

59 East Madison Street, CHICAGO

HORACE M. SWETLAND, Pres. W. I. RALPH, Vice-Pres.  
E. M. COREY, Treas. A. B. SWETLAND, Gen. Mgr.

Member Audit Bureau of Circulations; Member Assoc. Business Papers, Inc.

Vol. XXXVIII. December 16, 1920 No. 25

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## MOTOR AGE

MALLERS BUILDING Phone Randolph 6960  
CHICAGO Cable Address "Motage"

E. E. HAIGHT, Manager

DAVID BEECROFT, Directing Editor

RAY W. SHERMAN, Executive Editor B. M. IKERT, Editor

### BRANCH OFFICES

DETROIT, 95 Fort St., W., Phone Maine 1351

CLEVELAND, 536-540 Guardian Bldg., Main 6432

NEW YORK CITY, U. P. C. Bldg., 239 W. 39th St.

Phone Bryant 8760

PHILADELPHIA, Widener Bldg., Phone Locust 342-343

### SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions.....	\$ 5.00 per year
Canada.....	7.00 per year
All Other Countries in Postal Union.....	10.00 per year
Single Copies.....	35 cents

Make Checks Payable to Motor Age

Entered as second-class matter, September 19, 1899, at the Post Office, Chicago, Illinois, under Act of March 3, 1879.

Owned by UNITED PUBLISHERS CORPORATION, 239 W. 39th St., New York, H. M. Swetland, Pres.; Charles S. Phillips, Vice-Pres.; A. C. Pearson, Treas.; Fritz J. Frank, Sec.

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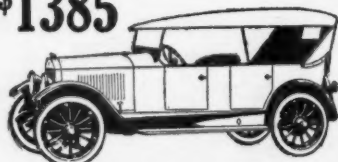
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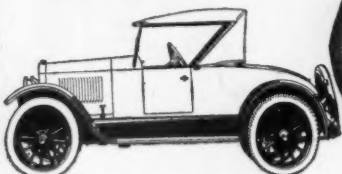
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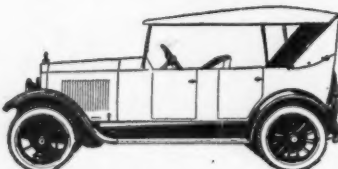
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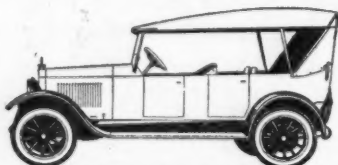
Velie Model 34 Touring. The Lowest-Priced Six-Cylinder, Cord-Equipped Car on the Market. Winner of the Dyas Gold Trophy. A Marvel of Fuel Economy.



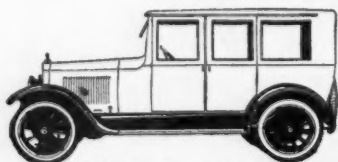
Model 34 Two-Passenger Touring Roadster.



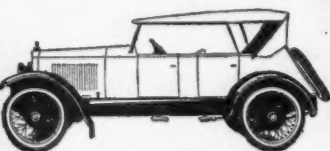
Model 48 Five-Passenger Touring. The Larger Six.



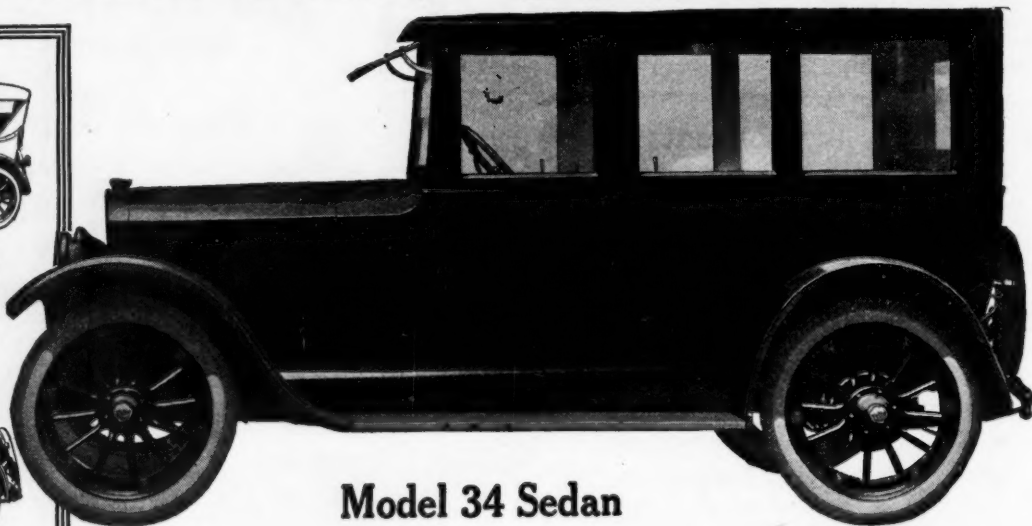
Model 48 Seven-Passenger. The Larger Six.



Model 48 Sedan. The Larger Six.



Model 48 Speedster. The Larger Six.



Model 34 Sedan

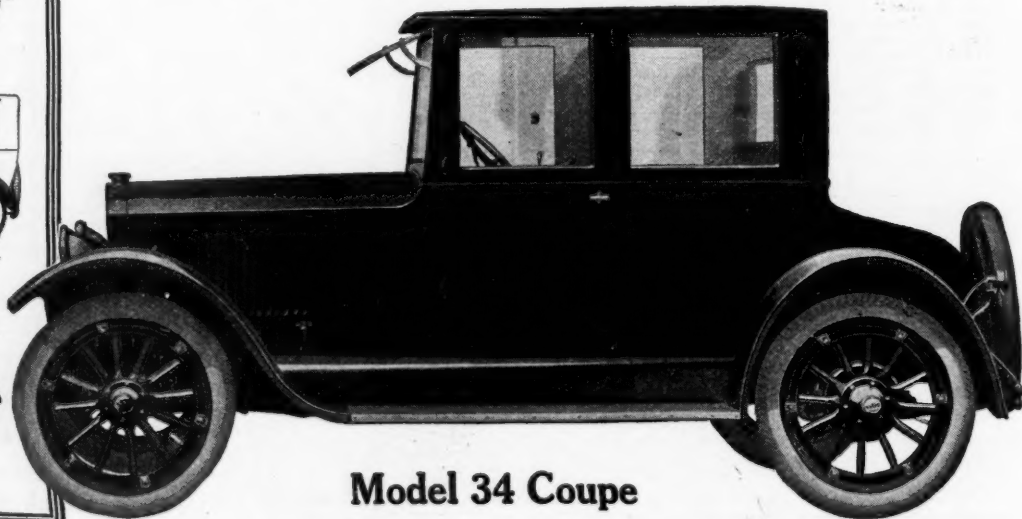
WITH the amazingly low prices on Velie Sedans and Coupes, we give the same guarantee as on our open cars.

If there should be a further decline in list prices before July 1, 1921, we will rebate the difference *in cash*. The Velie Bond guaranteeing this goes to every purchaser. At the Velie's present low prices, you have never seen the equal of Velie closed car comfort, luxury, beauty and equipment. These roomy cars with temperature equipment for just the degree desired give indoor coziness against zero blasts. Instantly opened for

fine weather. The All-Season Cars, richly upholstered in mohair velvet—gleaming in the Velie lasting mirror finish. Complete in every refinement.

With our 1921 line, the Velie Dealer's opportunity is exceptional. Think of offering a Velie Six-cylinder Touring Car, Cord-equipped at \$1385. The Velie line commands a fast-selling market wherever it is presented. The Velie reputation for quality-building is a great business asset. You are especially invited to see the Velie at the shows. Inquire about your territory. If it is not closed, we have an interesting proposition to offer.

VELIE MOTORS CORPORATION, 113 Velie Place, Moline, Ill.



Model 34 Coupe

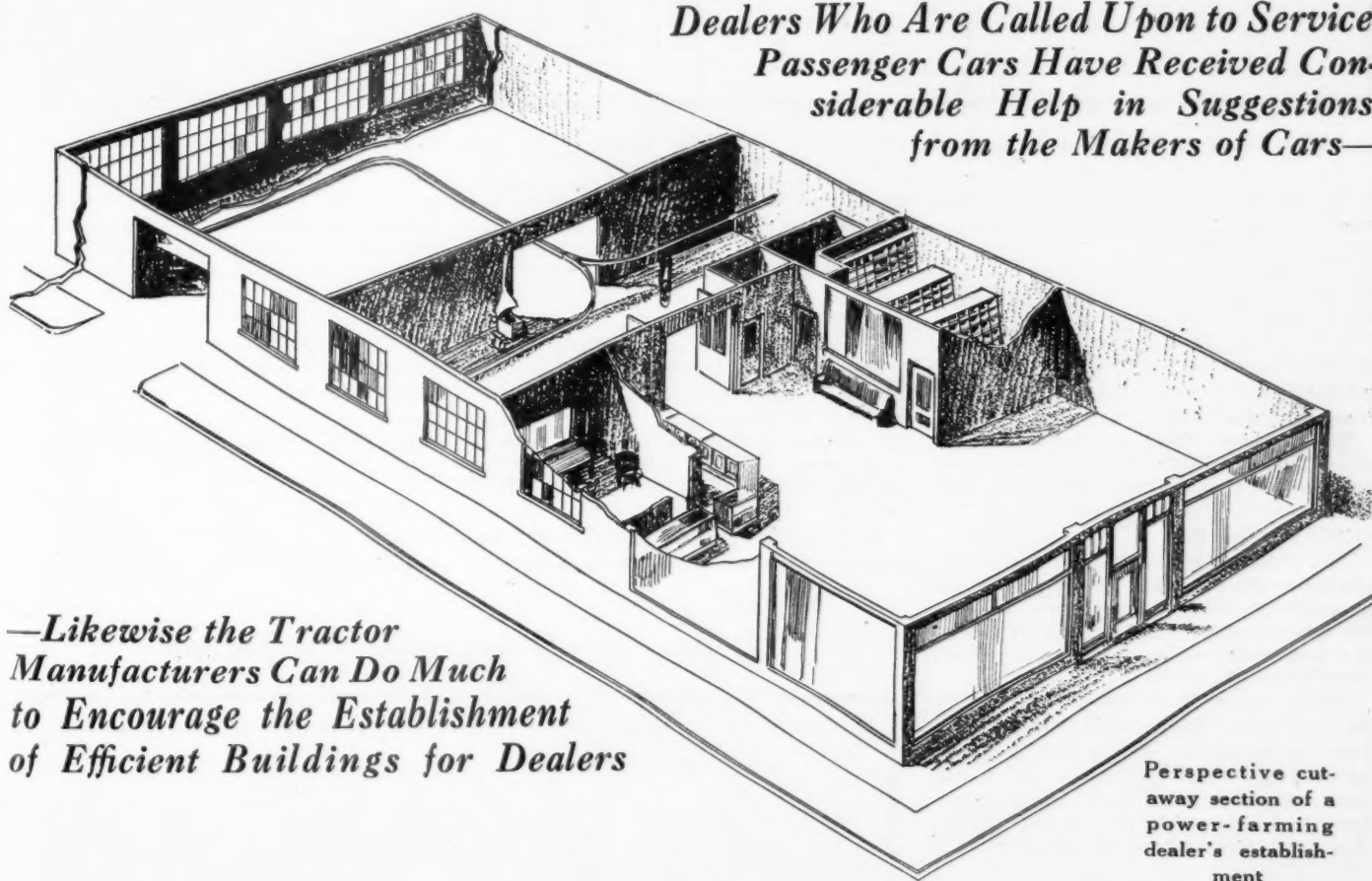
## See Velie 1921 Line at the Shows



# MOTOR AGE

## *Laying Out and Equipping the* **Power-Farming Dealer's Business**

*Dealers Who Are Called Upon to Service  
Passenger Cars Have Received Con-  
siderable Help in Suggestions  
from the Makers of Cars—*



*—Likewise the Tractor  
Manufacturers Can Do Much  
to Encourage the Establishment  
of Efficient Buildings for Dealers*

Perspective cut-  
away section of a  
power-farming  
dealer's establish-  
ment

**I**T USED to be said and probably still is true to a large extent that the tractor manufacturer does not co-operate sufficiently with his dealers in planning and conducting their business so that it can be handled in the most approved way.

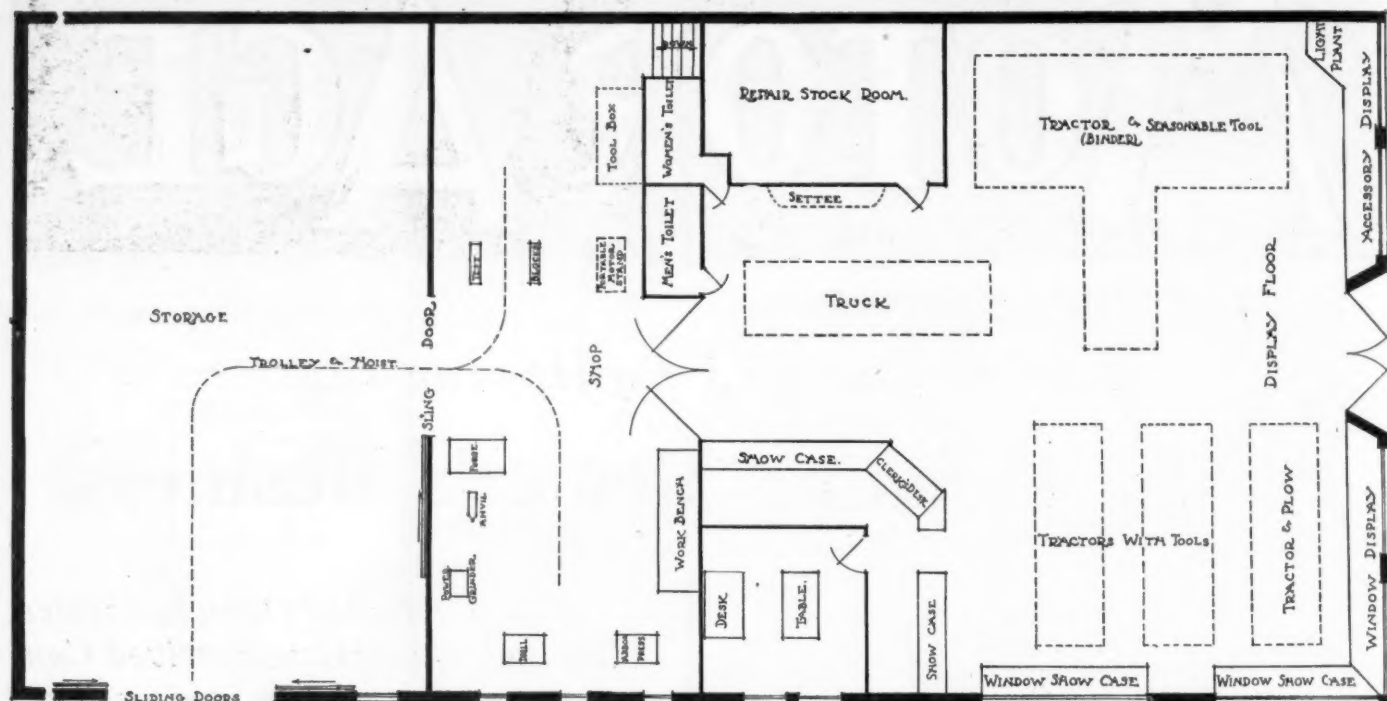
One of the large tractor producers of the country has realized this situation and during the last few months has drawn up the plans and specifications of what is considered to be an up-to-date power-farming dealer's place of business. Not only has this concern planned the building, but it has gone to the extent of showing the dealer just what equipment he should have,

even down to small tools like cotter-pin removers.

The plans on the next pages have been prepared by the Moline Plow Co., Moline, Ill., to take care of dealers handling a full Moline power line. These plans can, however, be changed to meet the demands of other dealers, because, basically, the rendering of service on one make of tractor will not differ a great deal from another.

Attention is directed to the upper right hand corner of the floor plan where provision has been made for the lighting plant and accessory display. This brings the lighting plant in operation together with the acces-

## Plan View of the Power-Farming Dealer's Building



With modifications this layout can be changed to meet the demands of practically any power-farming dealer

sories directly in front of the big display window, where it will attract the attention of the public.

The other front display window can be used for changeable tractor or implement displays and suggest the use of window show cases in the two front side windows in which a more or less permanent display of repair parts can be kept free from dust and dirt.

The private office is surrounded by show cases containing accessories and supplies with a clerk's desk facing the display floor and in clear view of the repair stockroom.

The repair stock should be under the charge of the clerk and no repairs should be removed from the stockroom without his knowledge so that he could also make the necessary entry in the repair stock record and bin index.

Room has been provided for a settee on the display floor. This will do much towards increasing the sale of goods as in getting to the rest room and settee they naturally must pass by the tractors, tools, etc., that are on the display floor and this cannot be done without their notice.

### REPAIR SHOP ARRANGED FOR BEST DAYLIGHT ADVANTAGES

The private office is arranged with glass windows on all four sides so that the executive has a clear view of the machine shop and display floor at all times. The repair shop has been arranged so that as much daylight as possible is obtainable and also for a convenient arrangement of work benches and tools.

The trolley and hoist communicating with the large sliding doors in the storage room enable large and heavy pieces

to be carried conveniently to any part of the shop and also make it possible to remove an engine from the tractor when it is standing on the test blocks and carry it to any part of the storage room or machine shop.

These plans and perspective of the power-farming dealer's store are, of course, subject to expansion and alteration to fit the building requirements of the dealer, but most dealers with a good sized building will find that this arrangement can be easily accomplished and will be very satisfactory.

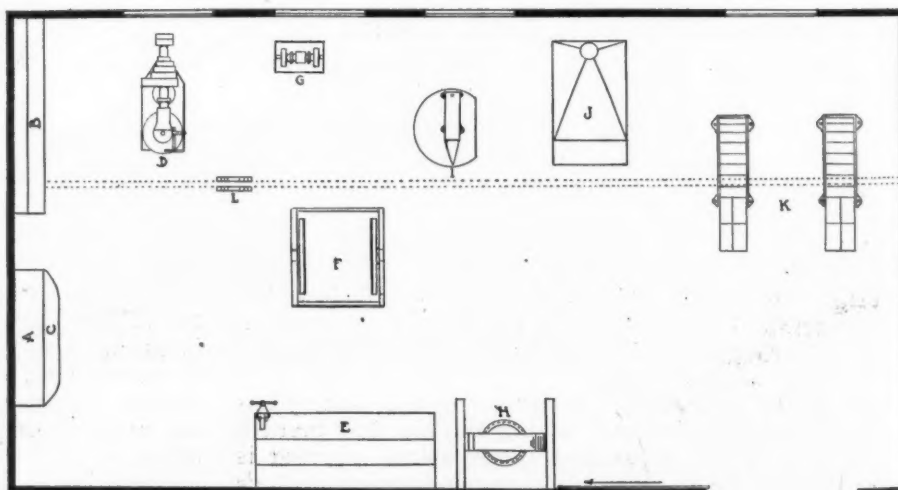
It is especially recommended that the display floor be used for display pur-

poses only and that it be kept in an orderly condition with seasonable tools always on display and that all setting up and repair work be done in the shop or storage room. Accordingly arrangement should be made for swinging and sliding doors of sufficient width to permit assembled tools and implements to pass through.

### POWER-FARMING DEALER'S REPAIR SHOP

This diagram shows the practical arrangement of necessary machinery for taking care of service work on tractors

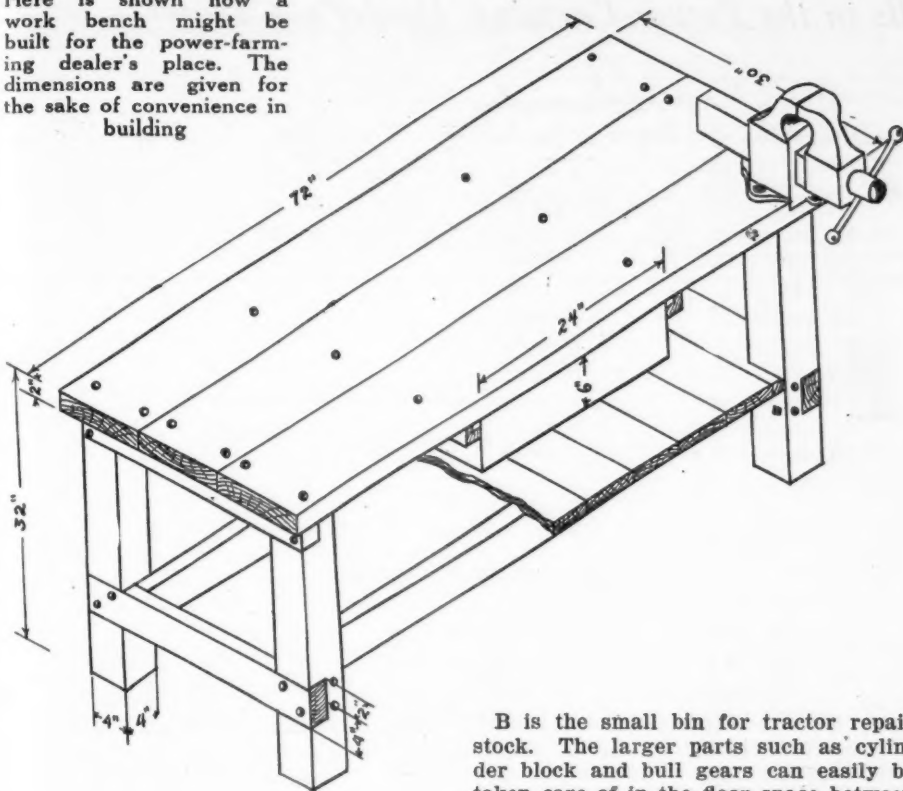
## Layout of the Machine Equipment



While the shape of a building may decide the placement of the equipment in a shop, this layout will be found adaptable to the average building



Here is shown how a work bench might be built for the power-farming dealer's place. The dimensions are given for the sake of convenience in building



and implements. The size of the interior of the shop is approximately 15½ ft. which gives plenty of space for the machinery shown.

A is the tool cabinet for holding drills, taps, dies, etc., as shown and described on another page.

B is the small bin for tractor repair stock. The larger parts such as cylinder block and bull gears can easily be taken care of in the floor space between A and the wall and B. There is ample space on the side of the stock bin and the wall space between A and B for the gaskets.

C is a standing desk placed at a convenient height directly below the tool cabinet and this will be found convenient for keeping the stock record and bin in-

dex and other shop records of a clerical nature.

Of course, in cases where the dealer's store and shop are placed and arranged as shown the stock bin number B and the stock record and bin index as shown would not be necessary in the shop itself but the desk would still be more or less useful for the men who make the records of work done and fill out job cards.

D is a 20 in. drill press with back gears. This drill press will be found adequate to handle any kind of drilling or boring work that is required. The table can be moved to one side and a cylinder block placed on the base and the cylinders rebored by use of the drill press instead of hand power.

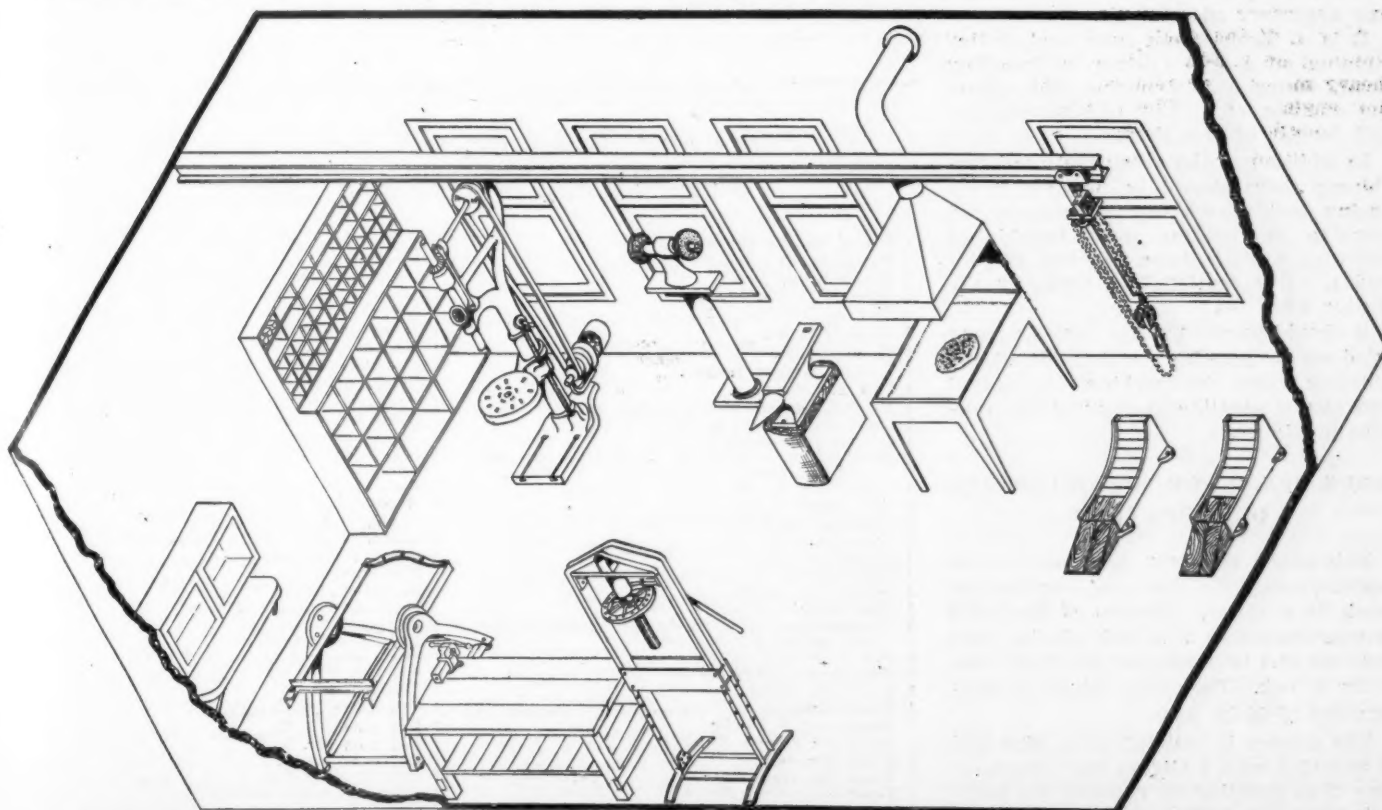
#### PORTABLE ENGINE STAND FOR EASY HANDLING

E is the work bench which will be found adequate to take care of the shop requirements and with drawer space large enough to conveniently care for the tools most commonly used. It is provided with a 5-in. vise.

F is a portable engine stand. On this the engine can be placed and inverted or placed at any angle for convenience of doing work on it. It also can be used as a running-in stand for the engine.

G is a power grinder on a pedestal. This is a grinder having a 1 in. spindle with two 6-in. wheels, one quite coarse and the other for finer work. Its location permits of handling long pieces to be ground without interference with

### *Perspective of the Repair Shop, Showing the Position of Machine Equipment*



How the shop of this power-farming dealer's place of business would look if you could see it. The position of the machines in this perspective view of the shop has been carefully worked out and will be found practical

## Dies, Taps and Drills in the Power-Farming Dealer's Cabinet

Dies, SAE	Plug-Bottoming Taper Taps, SAE	Dies, USS	Plug-Bottoming Taper Taps, USS	Dies, Pipe	Taps, Pipe
1/4 inch—28	1/4 inch	1/4 inch—20	1/4 inch	1/8 inch—27	1/8 inch
5/16 inch—24	5/16 inch	5/16 inch—18	5/16 inch	3/8 inch—18	3/8 inch
3/8 inch—24	3/8 inch	3/8 inch—16	3/8 inch	1/2 inch—14	1/2 inch
7/16 inch—20	7/16 inch	7/16 inch—14	7/16 inch	3/4 inch—14	3/4 inch
1/2 inch—20	1/2 inch	1/2 inch—13	1/2 inch		
9/16 inch—18	9/16 inch	9/16 inch—12	9/16 inch		
5/8 inch—18	5/8 inch	5/8 inch—11	5/8 inch		
11/16 inch—16	11/16 inch	11/16 inch—11	11/16 inch		
3/4 inch—16	3/4 inch	3/4 inch—10	3/4 inch		
7/8 inch—14	13/16 inch	7/8 inch—9	7/8 inch		
15/16 inch—14	7/8 inch	15/16 inch—9	1 inch		
1 inch—14	15/16 inch	1 inch—8			
	1 inch				

other machinery or sides of the building.

H is a 20-ton arbor press which will be found very convenient for pressing out bushings, etc. I is a 100 lb. anvil set on a block of wood.

J is a hand forge which is almost a necessity in any well arranged shop. This is so planned that it is possible, if so desired, to run the blower with a belt from the line shaft which operates the grinder and drill press.

K is the running-in blocks. The tractor can be taken in through the doors at the right of the arbor press and run directly into the running-in blocks from which position if necessary the engine can be lifted by means of a hoist and trolley which runs lengthwise of the shop.

The blocks are so arranged that it gives plenty of space in front and on both sides of the drive wheels to make any necessary adjustments.

L is a 1/2-ton chain hoist and trolley running on a 5-in. I beam for handling heavy material or removing and replacing engines, etc. This trolley runs the full length of the shop.

In addition to the above tools and machinery there should be provided a re-boring tool, piston and connecting rod aligning jig, brazing torch capable of throwing a 14-in. flame, all-steel tool kit and a valve seating tool made by the Moline Plow Co.

It should be arranged to have as many windows as possible on the side of the building where the machinery is located and also if possible in front of the running-in blocks.

### WORK BENCH FOR POWER-FARMING DEALER'S SHOP

This bench has been designed to conveniently care for the usual run of shop work by a dealer. The top of the bench is constructed of 2 in. oak planks. The legs are of 4 by 4 oak and the braces are 2 by 4 oak. The lower shelf is constructed of 3/4-in. pine.

The drawer is built of 3/4-in. pine and is provided with a sliding and removable tray thus doubling its capacity for tools. All parts are bolted together and with the lower shelf cut away as it is shown

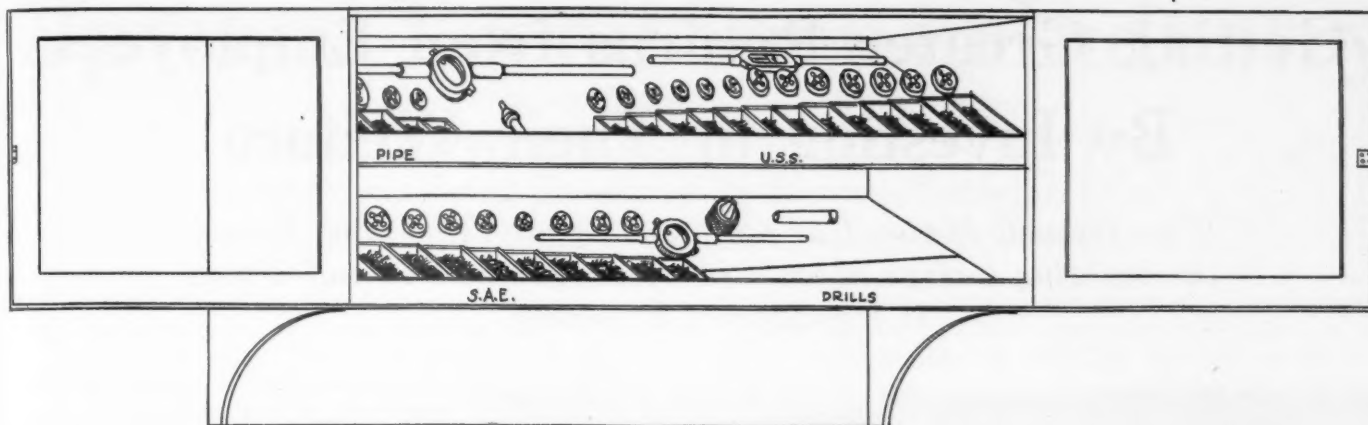
### DRILL STRAIGHT SHANK

7/64 inch	13/32 inch	5/8 inch
3/16 inch	27/64 inch	41/64 inch
7/32 inch	7/16 inch	21/32 inch
15/64 inch	29/64 inch	43/64 inch
1/4 inch	15/32 inch	11/16 inch
17/64 inch	31/64 inch	45/64 inch
9/32 inch	1/2 inch	23/32 inch
19/64 inch	33/64 inch	47/64 inch
5/16 inch	17/32 inch	3/4 inch
21/64 inch	35/64 inch	55/64 inch
11/32 inch	9/16 inch	7/8 inch
23/64 inch	37/64 inch	15/16 inch
3/8 inch	19/32 inch	31/32 inch
25/64 inch	39/64 inch	1 inch
<b>TAP WRENCHES</b>	<b>DIE STOCKS</b>	Chuck taper shank for
No. 5 Adjustable	2 inch O.D.	S. S. drills 0 to 3/4 in.
No. 7 Adjustable	1 1/2 inch O.D.	chuck wrench
	2 1/2 inch O.D.	

## Tools and Equipment Necessary in the Power-Farming Dealer's Shop

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>1 Pound brazing compound.</li> <li>1 Pound brazing solder.</li> <li>1 Heavy lifting jack.</li> <li>1 Wrench UTJ5001 A67.</li> <li>1 Wrench UTJ5001 A63.</li> <li>1 3/4 in. reamer.</li> <li>1 3/8 in. reamer.</li> <li>1 1 in. expanding reamer.</li> <li>1 Can soldering flux.</li> <li>1 Ratchet wrench with complete set of sockets.</li> <li>1 Spark plug socket wrench UTJ6013.</li> <li>1 Combination pliers 6 in.</li> <li>1 Small wiring pliers 5 in. Elec. long nose side cutting stubbs.</li> <li>1 Cold chisel 3/4 in.</li> <li>1 Cold chisel 1/2 in.</li> <li>1 Diamond point chisel 3/8 in.</li> <li>1 Cape chisel 1/4 in.</li> <li>1 Center punch.</li> <li>1 Prick punch.</li> <li>1 Small drift punch.</li> <li>1 Pipe wrench 10 in.</li> <li>1 Combination 10 in. inside and outside caliper and divider BB No. 840.</li> <li>1 File 10 in. flat mill.</li> <li>1 File 12 in. half-round mill.</li> <li>1 File 8 in. round.</li> <li>1 Breast drill.</li> <li>1 Tapwrench T handle.</li> <li>1 Taper pin reamer No. 2.</li> <li>1 Taper pin reamer No. 3.</li> <li>1 Taper pin reamer No. 4.</li> <li>1 Taper pin reamer No. 6.</li> <li>1 Combination square, No. 11, 12 in. center head.</li> </ul> | <ul style="list-style-type: none"> <li>1 Feeler gage, No. 1, 72A.</li> <li>1 Screw pitch gage, No. 40.</li> <li>1 Machinist hammer 12 oz.</li> <li>1 Screwdriver 10 in.</li> <li>1 Screwdriver 6 in.</li> <li>1 Adjustable wrench 10 in.</li> <li>1 Monkey wrench 10 in.</li> <li>1 Open end wrench No. 23, 3-16x1-4 D. E.</li> <li>1 Open end wrench No. 27 5-16x3-8 D. E.</li> <li>1 Open end wrench No. 729B 1-2x7-16 D. E.</li> <li>1 Open end wrench No. 725B 1-4x5-16 D. E.</li> <li>1 Open end wrench No. 607 1 1-16 S. E.</li> <li>1 Micrometers inside No. 124—Set A with case.</li> <li>1 Ammeter.</li> <li>1 Revolution counter, No. 329.</li> <li>1 Remy switch key 7827.</li> <li>1 Timing wrench, Remy No. 4896.</li> <li>1 Contact point wrench, Remy 2342.</li> <li>1 Offset screwdriver.</li> <li>1 Hydrometer.</li> <li>1 Remy equipment box.</li> <li>1 Dixie magneto screwdriver 6 in.</li> <li>1 Cotter pin extractor, No. 3.</li> <li>2 Extension bars 9 1/2 in.</li> <li>1 Hack saw and three blades.</li> <li>1 Tin snip 2 in. cut 2 in. long.</li> <li>1 Test indicator.</li> <li>1 Can valve grinding paste.</li> <li>1 Ezy outs No. 4.</li> <li>1 Ezy outs No. 5.</li> <li>1 Ezy outs No. 6.</li> <li>1 Contact point file.</li> <li>1 3/4 in. set screw wrench.</li> <li>1 Tube gasket cement.</li> </ul> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|





## Cabinet for Orderly Arrangement of Taps, Dies, Die Stocks, Etc.

Keeping everything in its place is essential in every shop. Here is shown a tool cabinet for keeping dies, taps, etc.

in the plan, the construction of all parts can be easily seen.

The legs, of course, could be built 2 by 4 if absolutely necessary but as weight is essential in a work bench to make it solid and immovable the use of 4 by 4 is recommended.

The lower shelf will be found convenient to keep the blow torch and the tool kit when not in use and there is also room for the chest containing the cylinder re boring tool.

### POWER-FARMING DEALER'S SPECIAL TOOL CABINET

This cabinet has been designed to supply a means whereby special and expensive tools such as taps, dies, die stocks and drills may be arranged so that they will be convenient for the mechanic when he wants them and at the same time be secure from the usual shop dirt and also arranged so that they may be locked up if necessary.

This cabinet is constructed from  $\frac{3}{4}$  in. dressed lumber and as shown in the sketch is 53 in. long by 11 in. deep and 30 in. high over all. This size will adequately handle the drills, taps, dies, die stocks and tap wrenches necessary for the average power-farming dealer's shop.

The shelves slope at an angle of about 45 deg., thus making the entire surface of each shelf easily visible. Doors can be provided which will close and lock thus securing the tools.

The upper shelf contains a set of USS taps of plug bottoming and taper assortments and suspended on nails directly above each box of taps is a corresponding adjustable round split die.

This arrangement makes it convenient in ascertaining where the dies or taps which have been removed from the cabinet belong when they are returned as it is seldom that both the taps and the dies of the same size are out at the same time. In case experience shows that this is often the case, trouble of this kind can be very easily avoided by using a very small stencil and on the shelf front in the position where the box of taps belongs stencil the size.

On the left end of this same shelf the pipe dies and taps are arranged and between these and the USS taps space has been provided for a small 3 adjustable tap wrench and the chuck wrench

for the power drill chuck. Directly above the pipe dies is the large die stock. The number 7 tap wrench is at the top and right of the top shelf.

On the lower shelf at the front and right are arranged the drills, while directly above them is the number 3 taper shank chuck for use on the power drill. In the front and on the left of the lower shelf are arranged the SAE taps with the dies directly above them. The 2 in. dies stock is placed about the center of the shelf directly above the taps and drills.

This cabinet is inexpensive to make as there are no intricate small compartments for the taps, the boxes in which the taps are received being used for this purpose with the covers removed and the dies and other tools are placed

over nails driven in the shelves. With this arrangement of the tools a glance at the tool cabinet enables anyone familiar with it to see if any of the tools are missing and provides a very easy method of checking the tools each night before closing shop.

### Check on Tools

It might be further elaborated on by outlining in black the tool in its proper position and in case numerous men are employed in the shop, it is suggested that each man have a number of small brass checks marked with their number or name and that when any one of these tools is removed from the cabinet the man taking same place his check on the nail or in the place from which the drill, tap or other tool is removed, the check to be removed only when tool is replaced in the cabinet.

## Next Week

**WE** have shown on the preceding pages the layout and equipment for a power-farming dealer's establishment as worked out by one of the largest tractor manufacturers. In this issue we have gone into the details of the building itself, the shop and the machine tool equipment.

Next week we shall publish plans and specifications of a tractor delivery truck, a service car, together with a simple accounting system to be used in connection with this week's article. This will be worth watching for, because it is one of the few instances of where a tractor maker has gone into every phase of the dealer's business for the purpose of making it easier and more profitable for him to handle the great power-farming line.

### TRACTOR WINS OVER HORSE

Chicago, Dec. 10.—The horse versus the tractor was the main topic of discussion at the meeting of the Mid-West section of the S. A. E. last night. E. B. Stone of the Cleveland Tractor Co., and Arnold Yerkes of the International Harvester Co., defended the statements of the tractor men that the horse is being displaced, and Wayne Dinsmore, Secretary of the American Horse Association, argued that it is not. Facts presented seemed to be in favor of the tractor and the argument created a feeling of determination to push its interests harder.

### NEW OLDSMOBILE ON COAST

San Francisco, Dec. 6.—Arrival of the first of the new four-cylindered Oldsmobile models to reach San Francisco proved one of the big events of the week on Automobile Row. A. D. Plughoff, general manager of J. W. Leavitt & Co., Oldsmobile distributors for the state, made a hurry-up trip to the factory to attend a conference of distributors from every part of the country. A complete line of the new models was unloaded here two days after Plughoff returned from the factory of the Olds Motor Works. The factory conference viewed the first completed cars of the new model and assisted in fixing the price, this depending on the size of quotas signed up for by the various distributors.

# Getting Greater Returns from Employees By Investing in Their Welfare

*The Howell Motor Car Co. Has Spent Time and Money  
in Building a High Morale in Its Organization and Finds  
It Far-Sighted Economy*



As Mr. Howell aptly expressed it: "Instead of the men standing around at noon cussing the 'boss' and things in general, with their lunch spread out on a greasy bench, how much more pleasant for them to eat in the above recreation room with clean surroundings and good-fellowship prevailing"

FOR the benefit of its employees, and to increase their efficiency, the Howell Motor Co. of Baltimore, Md., in planning its new building, made provision for a large recreation room, restaurant and hospital on the third floor as well as setting aside space in the basement for mechanics' dressing rooms with lockers, laboratories and shower baths.

A great deal of expense and careful planning have gone into making conditions ideal for the employees of this concern, and their object in doing this is two-fold. First of all, it decreases labor turnover and, secondly, influences the men to do better work. The strain of service work is great. The mechanic must of necessity be on his back half of the day in grease and oil, he must inhale gases, and he must work hard. Therefore, he should be watched carefully.

When a mechanic is found to be lagging in his work, the cause should be ascertained, and it has been found true by this concern, that nine times out of ten it is not due to laziness. Perhaps the mechanic has inhaled too many fumes and all that is needed is a little first aid, and that's where the hospital room fills its need. Then when the lunch hour comes around a place is provided where they can eat comfortably at clean, white oilclothed tables, and after lunch can spend the rest of the hour playing the piano, singing or reading.

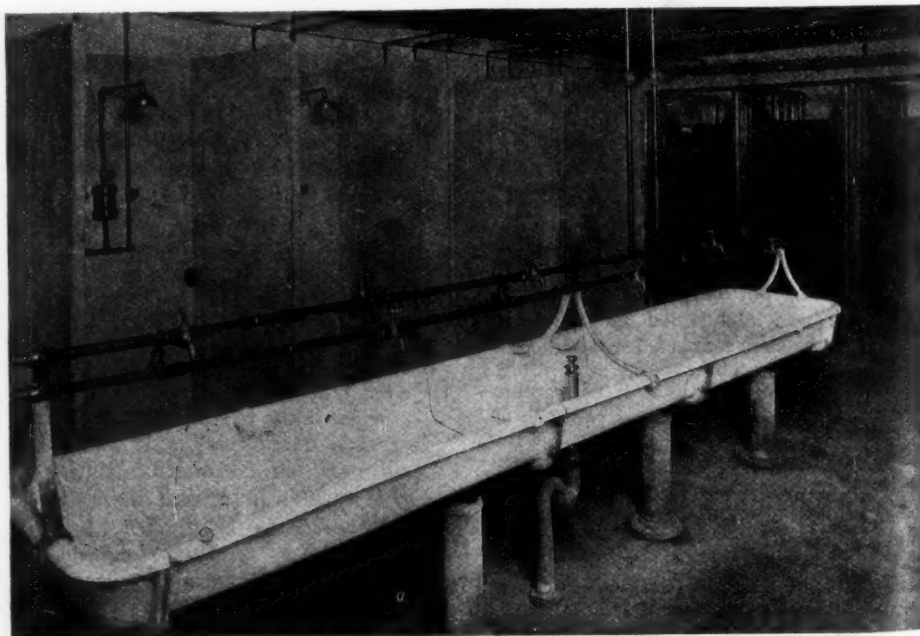
When the bell rings for work, they go back better men. They can throw their hearts into their work, and when extra

effort is requested for some rush or special work, it is forthcoming. It makes them more in sympathy with the man they are working for, and more willing to listen attentively to a talk on efficiency or how they can help improve the business.

Another policy of this concern in handling its mechanics is to find the right place in the organization for each man. For instance, if a mechanic is found to be good at transmission work, it is not considered good business to keep him at repairing radiators, and paying for his mistakes. This all makes for discontent, so by constant and careful observation frequent transfers are made and the type of work best suited to each individual is found.

This same reasoning is followed out in the sales department, and a salesman is transferred from the car to the truck end, or the reverse with equal facility.

All these things are bound to be considered by the mechanic when he is offered a slightly higher wage by some competitor who happens to be in need of extra mechanics and usually the humane treatment he is receiving from his present employer overweighs the advance in wages.



In the basement of the Howell Motor Co., Baltimore, are installed shower baths with hot and cold water. In the foreground is one of the wash basins. They permit twenty men to wash at one time. By eliminating the practice of quitting a few minutes ahead of time to get to the wash room first, Mr. Howell figures he saves eight hours a day



# Upward Trend Seen in Industry

*General Improvement Expected Around First of Year, Conditions Being Benefitted by Shows—Business, However, Must Be Conducted Along Conservative Lines*

NEW YORK, Dec. 13—Greater confidence has become apparent in the automotive industry in the past fortnight. This more hopeful feeling pervades all branches of the business, from the parts and accessory makers to the manufacturers of complete vehicles, distributors and dealers. There are signs of renewed life all along the line.

Parts manufacturers are receiving some substantial orders for deliveries covering a considerable period; passenger cars manufacturers already have increased their daily schedules slightly or are preparing to do so in the near future; increased interest is being shown in trucks and there has been some stimulation of sales at

retail in most sections of the country. The Goodyear Tire & Rubber Co. has called back 9,000 former employees preparatory to doubling its present production Jan. 1.

The last half of the month promises to be one of the duller fortnights of the year so far as production is concerned, however, for it will be used by many companies to take inventory preparatory to the upward turn expected in January. Predictions of better business in the near future are based largely upon the belief that the show season, with the attendant advertising campaigns will stimulate interest in automobiles and bring a substantial crop of orders.

THESE expectations undoubtedly will be realized and conditions throughout the industry probably will improve with the beginning of 1921. The improvement will not be rapid, however, and it will be some time before factories are back at the peak of production reached early this year.

Hopes that the automobile business will reach a normal basis any more quickly than other industries are idle. As MOTOR AGE has pointed out repeatedly, the return to normal is dependent solely upon the restoration of a general price level at which the public will buy. This does not mean advocacy of lower prices for motor cars. It means that when the average family budget gets down to what the average man considers fair proportions he will begin thinking about a new motor car. He will not be so much concerned about the price of the car as he will about the price of beefsteak, shoes and a spring suit.

Any one who pretends to predict accurately when that time will come merely is guessing. It will be brought immeasurably nearer when the retailers of household commodities pass on to the consumers the reductions which already have been made in the wholesale prices of commodities. Regardless of the justice of his contention that he cannot afford to sell at their replacement value the goods he bought at peak prices, it is unquestionably the retailer who is retarding the process of readjustment. The retailer is clinging desperately to the hope that he can unload his high-cost goods during the holiday rush. The break in retail prices probably will come, therefore, soon after Jan. 1.

There is nothing especially extraordinary about the present industrial depression. The conditions which now prevail always have been associated with the collapse at the end of a period of over expansion and great prosperity. The most remarkable circumstance is

## Goodyear Tire Co. Puts Back 9,000 Employees

AKRON, O., Dec. 10—Good-year Tire Co. today notified 9,000 former employees to report for work January 1, and announced an increase in production from 6,500 tires daily to 12,000. They say this increase is necessary as business is picking up and tire surplus being absorbed. Heavy spring trade is expected. This is the first optimistic note that has crept into the tire situation since the peak of production and prosperity in Akron crumpled under severe retrenchment policies last summer.

that there has been no panic in the generally accepted meaning of the word. Devout thanks for this blessing should be given to the Federal Reserve system. The banks within this system are safe and there will be no bank failures except small institutions in the agricultural districts. Discussing this subject in its December bulletin, the National City Bank says:

"This slump in business conditions has demonstrated again that the great movements which make good times or bad times are spontaneous and beyond control. They are due to mass action and mass psychology. The business of the country depends upon the purchases and policies of tens of millions of individuals and when they become generally pos-

sessed of a spirit of confidence and go ahead with their planning and spending under its influence, we have a period of prosperity."

Bankers and students of economics generally, in forecasts of the future, fix March as the real turning point. They point out that credit conditions will be markedly easier after the first of the year and that this will bring a feeling of greater confidence which will lead gradually to a resumption of business in all lines. As has been said before, however, this will depend upon the establishment of a normal and more or less stable price level.

In thinking of the future and the better business which it undoubtedly will bring, the manufacturer and dealer should not forget that there has been a marked shrinkage in the potential purchasing power of the country. The depreciation in crop value has meant a curtailment of between six and eight billion dollars in the purchasing power of the agricultural population. Makers and sellers of goods cannot go on as though this had not occurred. The price of what the farmer wants to buy must come down to the level of what he has to sell before a balance can be restored. Until that time comes the farmer will buy only what he has to have and he will be in no mood to bandy words with salesmen. It would seem logical that this should apply with especial emphasis to automobiles.

When the agricultural population is mentioned it means the growers of grain, cotton, sugar, rice, wool, hogs and cattle and scores of other commodities. The ramifications of this industry affect probably half the population of the United States and the purchasing power of more than fifty million people will be correspondingly cut.

Another important factor in the situation which must be readjusted before

(Continued on page 27.)

# HOW TO WRITE SALES LETTERS

## Stimulating Action

**T**HIS is the fourth and last of a series on letter writing for greater results. The same fundamental principles that apply to successful salesmanship are likewise applicable to sales letters. In planning a letter or set of sales efforts in the form of letters, it is always well to keep in mind these fundamental principles which may be classed as follows:

- 1—Attract Attention
- 2—Arouse Interest
- 3—Create Desire
- 4—STIMULATE ACTION

Each one of these elements should follow in logical sequence and, if properly handled, should produce the desired effect.

By J. R. HANNON

**W**E have read how to attract attention, arouse interest and create desire in our sales letter and now we must learn how to make our prospect act—take advantage of our offer. This matter of stimulating action usually winds up our sales letter and—in most cases—comes in the closing paragraph. Here is where we sum up our selling argument in a brief but forcible way to get quick action from our reader.

Let's bear in mind that our letter as a whole must convince our prospect that he needs and wants our goods. Then he will not object to ordering immediately. If it doesn't do this the chances are the letter will visit the waste basket. The purpose then of closing our last paragraph must be to get our reader to "obey that impulse" to do at once what we have asked him to do.

No matter how successful we are in getting our reader to read our letter we don't gain anything unless we induce him to act—"place his signature on the dotted line" as the salesman says. Don't leave it to your reader to decide for himself whether or not he should take advantage of your offer; in other words, don't weaken but, rather, keep your proposition well in mind, persuade your reader that it is to his gain to act while the matter is fresh in mind.

There are many ways of inducing action, such as by a special time offer, discounts, guarantee with refund of payment if not satisfactory, limited stock on hand, etc. After summarizing the strong points in your proposition, you must then clinch your argument with a good simple statement, telling him what to do so there will be no obstacles left for not doing so.

Imagine yourself talking to a customer about the car you handle, or the particular job you can do for him. When you are trying to sell him and have succeeded in getting him to the point of placing an order, you don't tell him to let you know his decision next week or ask him to mail you the order, do you? No, you don't, but you do place an order blank before him and a pen or

pencil too, so that your sales argument is complete and your customer is sold.

This is similar to what you must do with your sales letter, only you must do so by the written word instead of the spoken word. To help accomplish this you can enclose a convenient return blank, order card or something that the reader can fill out and mail at once.

The following are examples of action-impelling paragraphs:

*You understand, of course, that this spotlight must be satisfactory or we make good at once. Mistakes will happen but we're willing to pay for ours.*

*Don't run any chances of being without this spotlight any longer. There are only 100 to be sold in this manner so write your name on the enclosed card and return it today.*

Note the guarantee and the plea to "write and mail TODAY." It's much better to ask your reader to "write in" or "fill in" the card or order blank than to tell him to sign it because most people dread "signing" anything.

Here's another example of how one dealer makes it easy for the reader to act. He is given something definite to do in such a way that makes it easy:

*Will you drop into our place on your way home this afternoon or evening? Or, better still, phone us to bring an.....around to your office. Call Central 1286 and ask for.....*

If you expect to secure business from your letters be sure that you never use stereotyped or time-worn phrases, such as:

*"Thanking you for past favors and hoping to receive your order,"*

*"Assuring you of our desire to be of service to you and awaiting your valued order,"*

*"Hoping to hear from you by return mail,"*



Such endings as these should never be used in any kind of correspondence; they are a relic of old days and mean nothing. Some writers still seem to think that a letter doesn't end right without them but they would get much further without using them. These expres-

sions and other relics, such as "Your esteemed favor," "We beg to remain," "Yours of the 14th inst."—instead of "Your letter dated November 14th—are more of the phrases that are no longer being associated with good business correspondence.

### Suggested "Good Will" Letter to Be Sent Customers Thanking Them for Patronage and Inquiring If Work Was Satisfactory

Dear Sir:—

During the past month you entrusted us with the responsibility of making repairs on your car.

We earnestly hope the work was satisfactory in every respect, but if not, we would deem it a great favor if you would tell us about it.

Your patronage and that of others we serve is appreciated. It is our desire that the work we do be entirely satisfactory, but naturally "none of us are perfect" and if there are any weaknesses in our organization we want to know about it and eliminate them so far as humanly possible.

If at any other time you have any trouble with your car, we shall be only too glad to give you prompt service.

Very truly yours,  
BLANK MOTOR COMPANY  
Manager.

### Suggested Letter for Regular Customers Who Have Not Had Any Service Performed on Their Cars Recently

Dear Sir:—

There is no part of our business in which we take greater pride than the good will of yourself and other car owners.

Our ambition is to give you the best service possible and to make your ownership of a Blank car both pleasant and profitable.

Your past indications of appreciation have done much to strengthen our determination and efforts to give you satisfactory service.

If by any chance we have failed to provide the service you have looked for, we want you to stop in and tell us so we may do what is necessary to continue cordial relations.

Very truly yours,  
BLANK MOTOR COMPANY  
Manager.

## A Selling Argument for the Motor Truck from a New Angle

IN discussing the question of horse hauling vs. motor truck, W. A. Carpenter of the Acme Motor Truck Co., Cadillac, Mich., says:

"While very much has been said upon this subject, the following comparison will illustrate in a striking way the difference between the two methods, and may present the matter in a different light than you have seen it before.

"The average 2-horse team will haul two tons over the average road, at a speed not greater than three miles per hour. Allowing one hour for the noon-day stop, and another hour for loading, unloading, resting on grades and miscellaneous delays, it is safe to say that the team will in a ten-hour day cover not more than 24 miles.

"But at least one hour in the early morning before starting on the trip, preferably longer, must be allowed for the horses to be fed, curried, harnessed and watered, also part of the noon hour must be devoted to care of the horses and at

night after working hours, some little time must be devoted to feeding, watering, bedding and currying them. All of this extra work must be done outside of the ten working hours, to say nothing of veterinary services. So much for the horse hauling method.

#### MILEAGE DIFFERENCE IN FIVE YEARS STARTLING

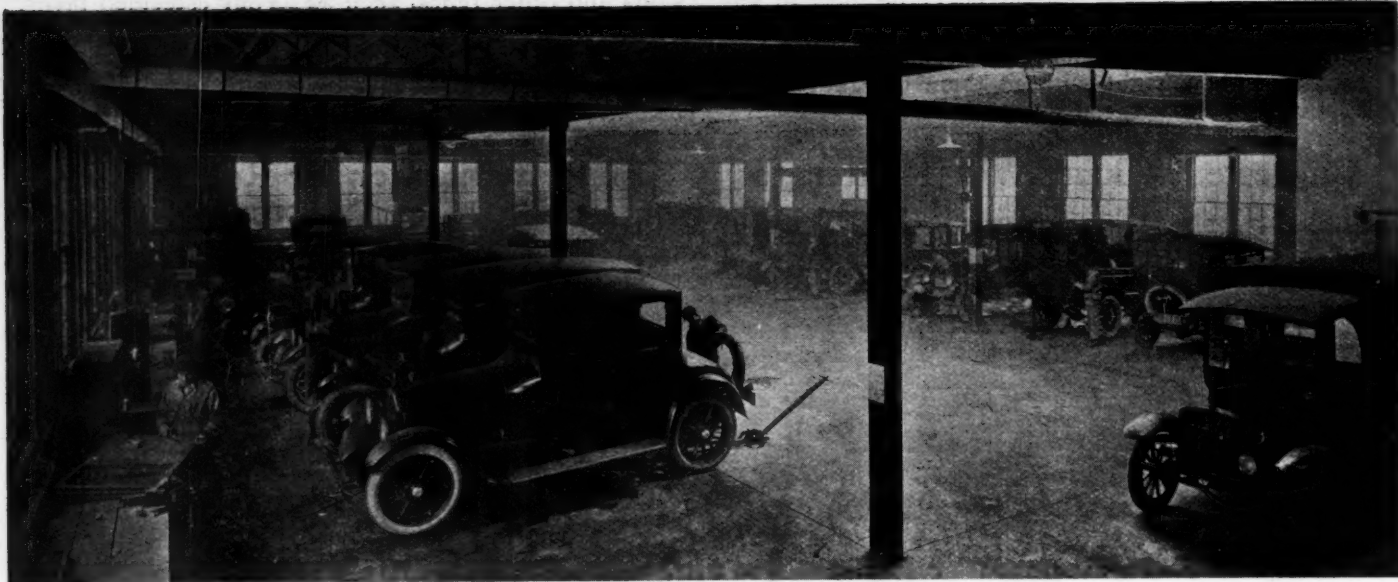
"Now for the truck's side: No preliminary work in the morning is necessary, with the exception of a few moments inspection every morning, desirable in any piece of machinery. Allow the same two hours lost time each day for truck as allowed for team, though the hour allowed for such delays will be confined to loading and the greater part of this time eliminated. At the close of the first day the truck will be 136 miles from place of starting (remember the team has made but 24 miles).

"At the close of 300 days, truck will be 40,800 miles from the starting point,

though during the 300 days the team has covered only 7,200 miles. In other words the truck has carried two tons 33,600 miles further than the team did in the same length of time. Keep this up for say, five years, if the horses are able to work steadily 300 days per year for five years, and we find the truck 168,000 miles ahead of the team."

Another firm converted on motor trucks is the Smith-Phillips Lumber Co. of Winston-Salem, N. C., which discovered by a cost-record system kept during 3½ months of this year that four horses and wagons were more expensive in maintenance than one Transport 2½-ton truck and did less work.

During the period in which the check was made the horses and wagons put the company to an expense of \$409.09 as compared to \$183.42 for their truck. Although the horses cost \$225.67 more than the truck their delivery record fell far below. The truck maintenance included gas, oil and repairs and license.



Looking in the service department of the Meyer Motor Car Co., Buffalo, Cleanliness is a feature of the repair department and combined with the flood of light coming in on the work a high morale of the organization is obtained

## Using *the* Guaranty Intelligently

*Though the Ninety-Day Guaranty Has Expired the Meyer Motor Car Co. Determines the Service Charge by the Facts in Each Case*

**I**T PAYS to be liberal—was the rock on which was founded the service department of the Meyer Motor Car Co., Buffalo. This is how it works out: One day a man drove a Reo car up to the door of the company's service department. Clayton Meyer greeted him. "This car needs a new so-and-so," said the man. The 90-day guarantee, which came with the

car, expired last week so I suppose I'll have to stand the cost."

He is told that the car will be fixed and that the Meyer company will bear the cost. When he drives away with the money that he expected to pay for the job, still in his pocket, he is thoroughly sold on the Meyer company.

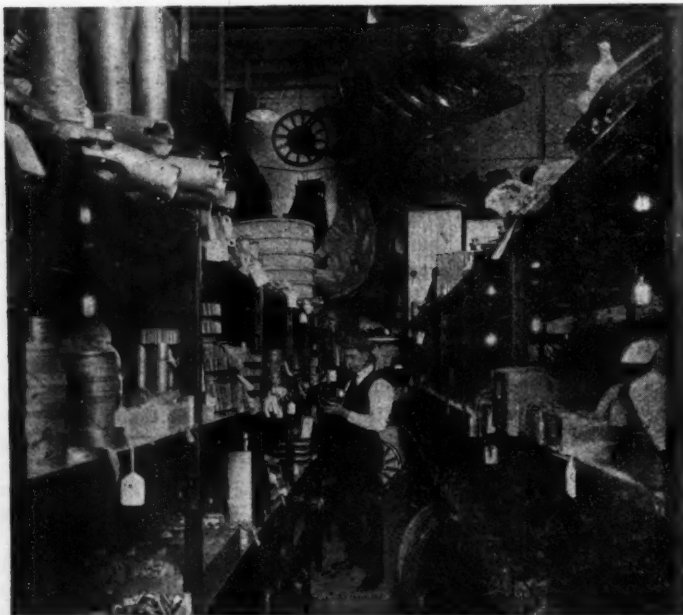
The Meyer company doesn't believe in holding a buyer down to the letter of the law in regard to the 90-day guarantee. It figures that this guaranty should be elastic so as to cover different cases. It realizes that few cars get the same usage, and while certain buyers could not reasonably ask for anything under the guarantee after the 90 days expire, there are others who would be entitled to the implied protection of the guaranty four or five or six or seven months after the sale of the car. The company tries to treat its customer right in the matter of the guaranty and invariably gives them the best of it in order to be sure to satisfy him.

It is the same with repairs. No ironclad rules prevail as to what customers shall be charged for repairs. Now and then, when differences of opinion involving a few dollars, threaten to arise or to be more specific, if the charge is \$8 when the customer is convinced that it should be \$5, why, \$5 it is, provided, of course, the company is convinced that the man is honest in his claim, and generally he is.

Next to saving money for Peerless and Reo owners the strong point of the Meyer company's service department is to save for them that other equally valuable commodity, time.

The company realizes that nothing so irritates the business man as to lose time. It also understands that even those who have much time at their disposal are not more keen about squandering it.

The company has therefore organized its service department into an efficient time-saver. It has two foremen and two repair gangs, one foreman and gang for the Peerless cars, the other foreman and gang for the Reo cars. The foremen are specialists on the respective cars. They are expert diagnosticians. They



A large stock of repair parts is carried and every bit of space is utilized. Note how the space consuming fenders have been suspended from the ceiling. There are five of these aisles in the parts department



are able to detect almost at a glance the cause of any ordinary trouble, and can find in an incredibly short time the source of more deeply-seated difficulties.

Having foremen like these enables the Meyer company to economize on time in locating car trouble. It saves the car owner's time and its own. The trouble ascertained, the foreman quickly decides what must be done to remedy it and imparts this knowledge rapidly to the mechanic already standing beside the car. If the job is a small one, the company does not pretend it is something serious that requires the car be left a day or two so as to provide an excuse for an exorbitant charge. Neither does the company charge for an hour's time when the job takes fifteen minutes, and offer the excuse that it makes no charges for less than an hour. If the work takes a quarter of an hour, the customer is charged for fifteen minutes and no more.

Another thing, if the car must be left the driver is told that he may have it at 2 p. m., and that means 2 p. m. It doesn't mean 2:30 nor 3, nor 4 p. m.

But perhaps the reader is asking how the company is able to always get jobs done on time, especially on rush days. Here's the answer: The Meyer people employ at all times more mechanics than they need most of the time. At times mechanics are standing in its service shop with nothing to do, but when they are wanted they are there. The company never has to say: "Sorry, old man, but we're in a great rush just now. I can't let you have your car before, etc." No matter how big the rush it has men enough to get out every repair job promptly, and to deliver the cars just when it says it will.

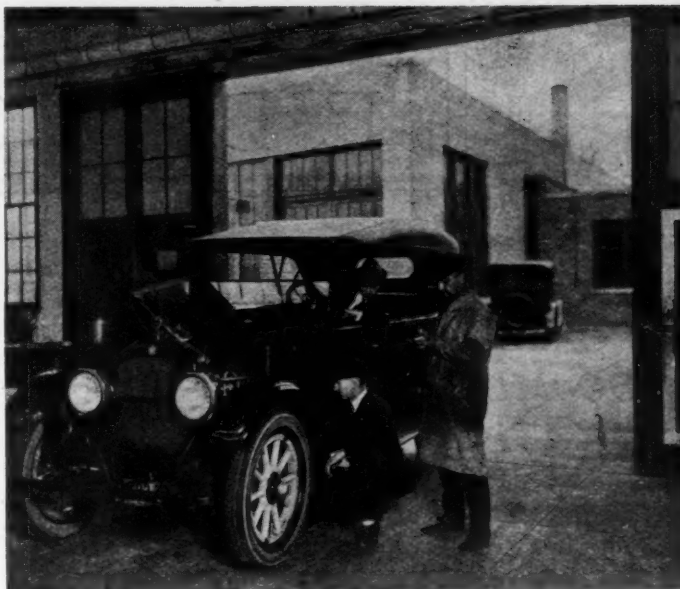
Reo or Peerless owners in Buffalo or vicinity never have to wait for parts. They are never deprived of the use of their cars for days at a time, while needed parts are being obtained from the factory. The Meyer Motor Car Co. has always on hand every part for every Peerless or Reo made since 1911 and it has some parts of Reo cars of even earlier vintage.

## "It Pays to Be Liberal"

**T**HAT'S the thought back of the Meyer Motor Car Co., Buffalo dealers, when a customer comes in for service after the expiration of the ninety-day guaranty, or in fact, at any time. Service costs money, as we all know, and should be paid for. "Free Service" has been the cause of losses in many dealers' service stations, starting small and growing until it becomes a "white elephant," eating up the profits. Read what this concern does about it and decide for yourself whether it can be controlled so as to build good will which in the end will show a great return.



Service foreman and mechanics in the organization of the Meyer Motor Car Co., Buffalo



A foreman and assistant foreman receive the customer at the door of the service department. These men are specialists on this particular car and no time is lost in diagnosing the trouble

The Peerless and Reo parts are kept in separate departments and each part has its separate bin. Enough of each part is always kept in stock to meet the company's needs for three months. If the supply of any part threatens to fall below that level it is replenished before the fall takes place.

Order prevails in the parts section of this company's service department. No one part is ever where any other part belongs. Each part is always right where it should be. Consequently, there is no time lost by mechanics or other employees in chasing around looking for this or that part. It is the same with tools and everything else.

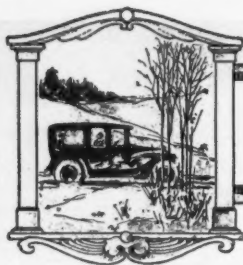
A record is kept of each repair job as it progresses—a sort of a dual record. On one tag is recorded the time taken for each job done on the car; on the other the parts are listed. When the job is finished the items on the tags are added up. The combined total of the two tags is what the job costs the customer. A record of that job in its entirety is entered in the company's books, so if a customer comes back in a month or two months or a year the company is able to show him just what was done to his car on this or that occasion. It is there in black and white, leaving no chance for argument.

This story would hardly be complete without reference to the fact that the Meyer company uses special diplomacy in dealing with service department customers when they are women.

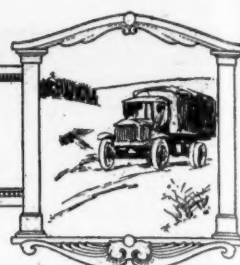
"When a woman comes in and we find her car has ceased to function because she has neglected to have some parts oiled," said Mr. Meyer, "we generally fix it. We seldom attempt to convince her that it was her fault. She wouldn't understand, ten chances to one, what we were saying, especially if it happened to be a bit technical, so we just fix it and refrain from charging her anything. Perhaps we suggest, casually, that it would be well to have her car greased now and then."

"Do we lose money by doing that sort of thing? Not as a rule. There are many women in Buffalo and the surrounding territory who are boosting for Peerless and Reo cars, and they send us a lot of business."

Plans and specifications of a tractor delivery truck and a light service car will be part of next week's issue. This will be of especial interest to tractor dealers—watch for it.



# EDITORIAL



## A CASE OF TOO MUCH TAXATION

cities, towns and villages have fallen into the habit of dealing unnecessarily hard with this source of revenue. How anyone in these enlightened days who is even remotely in touch with the industrial, commercial and agricultural activities of the nation can think of the automobile in any terms but of necessity is hard to imagine.

The Secretary of the Treasury has made recommendations for raising the country's budget for the ensuing year. He would collect from the automotive industry more than ten per cent of the four billion dollars which has been estimated to be necessary for the operation of the government, a percentage which would have taken care of one-half of the annual budget prepared in 1915.

It is a hopeful sign to note indications that the new Congress which will pass upon this legislation is not disposed to add any such tremendous burden to an all-important industry, until, at least, all taxes are equitably distributed and no cause shall be given for assuming that the tax is more or less in the nature of class legislation.



## TALK FOR THE GOOD OF ALL

business connections that would otherwise require a great deal of time and travel.

The manufacturer; jobber and dealer can meet and discuss the problems that are not understood by all and which cause friction between these various factors. In a manufacturing concern each individual branch of the business is asked to co-operate with the other branches. Where connections are close this is very easily accomplished but where the branches are widely separated as the manufacturer, jobber and dealer it is impossible to co-operate without knowing how to do it.

A national convention is the place where it is possible to bring the interests closely together and gain an insight into a business from all angles, providing the speakers devote their talent to the presentation of constructive information. Do men speaking at these conventions realize that when facing a body of men of this kind it is possible to create a reflection of comment that that is either good or detrimental to the firm they represent?

Remember that the Jobbers and Dealers are there to get the constructive information that will help them put

UNDER the assumption, presumably, that the automobile is a luxury and its owner logically a person well able to meet any demands placed upon him,

a product over, not to hear a product advertised. If, as a speaker at the convention, you impose on the men assembled and overstep the bounds of the opportunity that has been given to you by these men, by occupying the valuable time in advertising your own product, instead of offering the kind of thoughts that will help every fellow put his product over, you make an attempt to defeat the purpose of a National organization.



## THE COST OF INACCESSI- BILITY

perhaps valve grinding once a year and base the average repair cost on this assumption, we may arrive at a figure that is large enough to take one's breath away. Consider the task of valve grinding alone. If it is necessary that the mechanic take the vacuum tank off as well as the fan, the carburetor, the distributor, several throttle rods, the spark control levers, a manifold, either intake or exhaust or perhaps both and perhaps several other auxiliaries, before even starting to take the engine head off, one may well appreciate why repair work is costing money. The cost of removing and replacing the auxiliaries mentioned above will more than double the labor charge for the valve grinding task.

Such a small item as a fan belt is adding thousands of dollars to the motorists' car operating expense. Ordinarily one would think that a fan belt would be a very easy thing to replace, but there are designs where it is necessary to remove the front engine support from the frame in order to slip the fan belt in place. The fan belt will cost a dollar. The labor charge necessary to put it in place will many times exceed the cost of the belt in some of these cases.

Another feature allied to the same construction is the manner in which all of the auxiliary units are driven. Very often the water pump, generator, and distributor will be driven from one shaft. If it becomes necessary to remove the generator for some reason, the ignition system must be removed with it and consequently the car is tied up, whereas had the ignition been separate from the generator the car could have been run until the generator was repaired.

It will take perhaps a number of years to have these wrinkles of inaccessibility removed and replaced with better designs, but this is a good time for everyone concerned with the automotive business to think the subject over. If every dealer of a particular car, say, would make a written suggestion to the manufacturers that the storage battery be placed in a more convenient position, so that access to it could more easily be made thus cutting down on the dealer's expense, there is no doubt but what the manufacturer would heed this dealer's suggestions.

IF the average American motor car makes six or eight visits a year to the service station for major and minor repairs, such as easily made adjustments and



## Sales Efficiency Will Move Cars, Grant Executive Holds

**Art of Salesmanship, Lost for Three  
Years, Must Be Restored,  
He Says**

CLEVELAND, Dec. 10—Stockholders of the Grant Motor Co., have taken up an issue of 8 per cent notes that mature Nov. 21, 1921, according to an announcement made by George C. Hubbs, general manager of the corporation. The funds thus derived will be used to tide the company over existing conditions. Stockholders of the company met last week at the plant, saw the financial statement, looked over their investment and prospects and decided that the future was bright.

Mr. Hubbs, after the meeting, said that his company sold more cars this month, than in the last three months, and that he was confident business would gradually improve. He said that the whole situation has been aggravated by a willingness on the part of men in the industry to talk about difficulties of the present condition and by a neglect to put forth the increased activity that is needed.

"Sales efficiency means nothing when everything is running along smoothly and the public is coming in and taking cars away from the store," he said. "If we have mastered sales efficiency, now is the time to demonstrate, and every one in the Grant organization has been given that tip. It was not an exhibition of the mastery of salesmanship to make a big record in the last three years. I fear that we have temporarily lost the art of salesmanship, because of the easy time we have had recently. Things were coming so easy that a change in conditions caught many in the mental attitude of unconcern, and that attitude was caused because they have not had to hustle for sales."

"Genuine progress always is made when obstacles must be overcome, and the industry made its most substantial progress when it had to fight. Unless the condition exists that makes it necessary to fight for existence, persons in an industry are apt to become laggards."

"The time to fight is here; let's fight. Grant people are going to fight and watch us go."

### HANDLEY-KNIGHT DISTRIBUTORS

Kalamazoo, Dec. 10—The Handley-Knight Co. announces the appointment of distributors in the following cities: Chicago, Detroit, Milwaukee, Des Moines, Cleveland, Buffalo, Wheeling, Battle Creek, Huntington, W. Va.; Youngstown, Erie, Sandusky and Mansfield, Ohio; Joliet, Ill., Omaha, Joplin, Mo.; Ashville, N. C.; Jacksonville and Sanford, Fla.; Greenfield, Mass., and Elmira, N. Y.

### MANITOBA PUSHING SALES

Washington, Dec. 3—A review of the automobile industry in the province of

Manitoba, prepared for the Department of Commerce here by the American Vice Consul at Winnipeg shows that every effort is being made to push sales. Winnipeg is the western distributing center for American cars and the Western Canada Automotive Show in February is expected to boom business throughout the province.

Dealers in Winnipeg anticipate heavy truck sales as a result of the example set by the municipal authorities in asking for an appropriation to purchase ten new trailers. They are organizations of car owners who intend to petition the legislature for certificates or titles of ownership as a means of reducing the thefts of cars.

## Treasury Asks \$290,000,000 More in Taxes From Industry

Washington, D. C., Dec. 10—Secretary of the Treasury Houston has made special recommendations for raising \$5,000,000,000 which is considered necessary to run the government next year. The part of the tax recommendations which are of especial interest to the automotive industry are:

Increase of the sales tax from 5 per cent to 10 per cent which it is estimated will make an increase of \$100,000,000.

Federal license of cars based on 50 per cent per hp. \$100,000,000.

Consumption tax on gasoline at 2 cents per gallon \$90,000,000.

The new taxes from the industry will aggregate \$290,000,000. The truck sales tax will be continued at 3 per cent despite efforts to have it eliminated. The 10 per cent sales tax is applied, as now, to passenger cars, motor cycles, parts and accessories for these vehicles and will include tires.

### FORT WORTH OPENS SCHOOL

Fort Worth, Texas, Dec. 9—An automobile mechanics and welding school for former service men opened here Dec. 4 under the general direction of R. L. Paschal, principal of the Senior High School. Tuition is free. Funds for the school were contributed by the Knights of Columbus. F. P. Hall, head of the automobile mechanics department of Grubbs Vocational College, a state institution, is head of the welding department. Space for the training of the mechanics and welders is donated by local automobile concerns.

### NEW BLACK & DECKER BRANCH

Pittsburgh, Dec. 10—The Black & Decker Manufacturing Co. have established a new branch office here, at 303 Penn avenue, which will be the headquarters for the company's sales force in western New York, western Pennsylvania and the northwestern part of West Virginia. The office will be in charge of W. D. Royer, formerly sales engineer of the Robbins Electric Co. of this city. A service station has also been established at the same address and a factory trained mechanic will be on hand to offer service to users of the firm's products in that territory.

## Returning to Old Methods to Finance Dealers in Tractors

**Survey of Field Shows That Manufacturers Have Fallen Below  
Estimates of Last Year**

CHICAGO, Dec. 10—Tractor manufacturers are letting the bars down on credit and it is not unlikely that the present year will see a return to the methods used in financing the dealer which were prevalent in the implement trade prior to the appearance of the agricultural tractor and the C. O. D. way of doing business.

A number of the more prominent of the tractor manufacturers have been interviewed during the last ten days and they all say a return to the old methods of financing plans is inevitable. One manufacturer is laying plans to give regular implement terms on tractors, even when the dealer buys only one machine. Not alone will time be given but even the paper the dealer takes will be carried when it is good. Another says that while his contracts still are being written on the C. O. D. forms, he intends "to go with his dealers to the limit." Still another, hooking up his financing plan with that of the 100 per cent contract, is preparing to take care of his dealers and their tractor trade.

### Production Below Estimate

The production of tractors for 1920 shows a reduction for estimates made a year ago now of approximately 20 per cent. A careful survey of the field made by MOTOR AGE just a year ago showed that seventy-two tractor manufacturing concerns planned to build something in excess of 300,000 tractors for the current year. Hardly any of the concerns attained their estimate. Only one or two exceeded it, and these but slightly. The best figures available at this time indicate a total production for the year of from 240,000 to 250,000 machines.

The falling off has occurred for the most part within the last 90 days. Manufacturers began to slow up on production as soon as the Federal Reserve banks began to restrict credits, and at this time many of the factories are turning hardly a wheel, and some are shut down entirely. Nor will anyone say when full activity will be resumed. This means that in all probability the production of tractors during 1921 will hardly exceed in number the total produced during 1920. At least that is the opinion of a number of the leading makers who have been interviewed during the last two weeks.

Nevertheless there is no evidence of depression nor discouragement to be noticed. Every tractor manufacturer who in the past has had an appreciable production appears to be thoroughly convinced that the tractor is here to stay; that it is an economic necessity; that we must adopt power farming methods and that as soon as things readjust themselves a little buying will be resumed. Most of them believe there will be a

## Earl Leaves Willys-Overland; C. B. Wilson Vice-President

**No Reason Assigned for Resignation—New Executive Long Connected With Industry**

TOLEDO, Dec. 10—Clarence A. Earl has resigned as first vice-president of the Willys-Overland Co., and virtual head of the corporation's interests in this city, and has been succeeded by Charles B. Wilson, president of the Wilson Foundry & Machine Co., Pontiac, Mich., a Willys subsidiary. The retirement of Earl was forecast by the recent resignation of officers and department heads who had grown up in the Earl organization and were loyal to him. It became evident some time ago that Mr. Earl expected to leave Toledo soon when his residence there was offered for sale. The home of John N. Willys was placed on the market at the same time. It is generally expected here that the affairs of Willys-Overland will be centralized in New York from now on to a greater extent than before.

It has been recognized everywhere in the industry that Mr. Earl is not only a production man of the first rank, but a manufacturing executive of high rank. The progress of Overland in the last five years is regarded as a tribute to his ability. He joined the Willys organization after a successful career with the Hendee Mfg. Co., assuming the position of first vice-president in charge of manufacturing.

### Cuts Chassis Models

When he went with Willys-Overland he found eighteen chassis and thirty models comprising the company's product. In resigning he leaves only two models, both of which have gained wide popularity in their particular fields. Although the duties of Mr. Earl originally were confined to manufacturing it devolved on him to take the lead in building up a dealer organization and this organization today is admittedly one of the strongest in the country. He already has received hundreds of telegrams from dealers expressing regret at his resignation.

Mr. Earl has no definite plans for the future, although he has many things under consideration.

Mr. Wilson, the new executive vice president, took up his duties Monday, but declared he could not say when the factory would resume production, for the reason that he had not had time to familiarize himself with conditions. It is expected production in all departments will begin by the first of the year.

Mr. Wilson is highly regarded as an executive and is known as a close friend of Walter P. Chrysler. While he succeeds Mr. Earl, it is believed his duties will be confined to production. He joined the Olds Motor Works in 1898 and later went with the Ferro Foundry & Machine Co. He left that concern in 1914 to organize the Wilson Foundry

& Machine Co. He will continue as president of the foundry company, but the active management will be turned over to D. Wilson, his brother, now vice-president and sales manager.

New York, Dec. 10—The only statement forthcoming from the Willys headquarters in this city in reference to the resignation of Clarence A. Earl as first vice-president of Willys-Overland, was the brief announcement that John N. Willys had announced his retirement and the appointment of Charles B. Wil-

## Weight and Optimism

CLEVELAND, Dec. 10—A. O. Williams, weight 240 lb. and blessed with the fat man's optimism, has been appointed secretary of the Automotive Association of the Cleveland Chamber of Commerce. He has had considerable experience in selling in both commercial and passenger car lines. He is to devote his entire time to the secretaryship, and will succeed Clifford Brown, who was on the job part time.

son as his successor. Information as to the reasons for Mr. Earl's resignation was refused.

## Wizard Plant, Building Car For Export, Partly Finished

Charlotte, N. C., Dec. 10—One building of the plant which will be occupied by the Wizard Automobile Co. near this city already has been completed and other structures are contemplated. The product of the concern is designed largely for export through a contract placed by the Manufacturers & Exporters Alliance of New York. The company was incorporated early this year with a capitalization of \$1,000,000 divided equally between common and preferred stock. It takes its name from Wizard, N. C., a small town four miles west of this city where the plant is located.

The first product of the company will be the Wizard Junior, a 2-passenger roadster weighing 800 lb. with a 2-cylinder, 4 cycle, air cooled, 15 hp. motor to sell for \$395. A detachable delivery body also will be provided. It is planned eventually to manufacture a larger car to be known as the Wizard Senior.

### MAKING NEW SPARK PLUG

Columbus, Dec. 11—The L. & S. Manufacturing Co. has been chartered with a capital of \$30,000 for the purpose of manufacturing metal specialties and especially a new patented spark plug, styled the "Elleness." The company has a shop located at 2026 North High Street where the plugs are manufactured. It is planned to manufacture other automobile parts.

## Dealers at Convention Told Of Methods to Sell Tractors

**Service Essential Feature - Banker Should Be Sold and County Agent Not Neglected**

MILWAUKEE, Dec. 13—"Begin every line and sentence of your effort and end every line with service." This is what W. F. Loomis, manager of the Oliver Chilled Plow Works, Milwaukee department, told 1200 members of the Wisconsin Implement Dealers' Association in their convention in this city Dec. 8 to Dec. 11, in speaking on what to do about selling farm tractors and how to do it. In a room beyond, several hundred implement and tractor manufacturers had exhibits. The convention was the largest of its kind ever held in Wisconsin and it was asserted that this state has the biggest association in the country.

With a rising vote the members pledged themselves to go after the farm tractor business from now on.

Among Mr. Loomis' recommendations were these:

### Analyze Farmer's Needs

"Map your territory, large enough to show the names and addresses of farmers, roads, etc.

"Card-index every farmer, his farm story, acreage, kind of soil, topography, acres under plow, swamp land.

"Take as your territory only as much as you can handle with your present force and equipment. Don't take an inch more. And remember some farmers shouldn't be sold tractors yet.

"Now, analyze the data from two standpoints: How many should I sell next year? What tractor will fill the bill, based on the general averages of conditions, topography, etc., of the territory?

"Now visit a manufacturer of tractors. Take your mechanic along, too. See what is put into the machine and why. Don't forget horse power, never for a moment. Allow for over-loads. Aim high.

### Get the Banker First

"Sell your banker as your first customer. Show him your campaign—of course you will have a plan, just like the man that built this auditorium had a plan before they started. Get the manufacturer to help you on that. Money is going to be easier next spring. Sell the banker, and it will be given even more easy.

"Do not let any of your people or any other dealer's people sell the farmer, who takes a tractor, improper equipment in the way of implements. Remember that. Undersell on power. See that the equipment accompanying will not overload.

"Sell your county agent of the state agricultural department. They can help you immeasurably. They can and do talk modern methods, and less overhead. They are full of advice you need."



## Attention of Selling Force Centered on Truck Problems

**"Big Idea" Impressed on Representatives at Convention—Sales Managers Advise Policy**

ROCHESTER, Dec. 11—Rochester was known as the home of the "Big Idea" to more than sixty dealers and representatives from all parts of the country who convened here this week at the convention of the selling force of the Selden Truck Corp. The convention was something novel in the way of sales stimulation. In each hotel room occupied by the visitors, in the lobbies and the parlors of the hotels, and the executive offices of the firm, were signs bearing such legends as "You'll get the Big Idea before You Leave Rochester."

The big idea in the convention of the selling force was the carrying out in more detail the factory's method of merchandising trucks at a profit; a division of the burden of fluctuating marketing conditions; ways and means to overcome the prevailing discriminatory treatment on the part of the banks, and lastly making the Selden franchise so valuable that it will attract men of superior business ability.

Following numerous executive sessions and dinners, which lasted for two days, the sales managers of the various districts remained to take up the ideas expressed by the salesmen and dealers with the heads of the corporation, and those that they consider advisable, will be put into effect in the company's business.

On Monday morning, a joint meeting of the "Senate," which consists of thirty of the larger dealers, held a joint session with the Advisory Council, and later the delegates were shown through the plant of the Selden corporation. Following the inspection of the plant the topic, "Relations Between Distributors and Associate Dealers," was discussed. John Coleman, chief engineer at the Selden plant, told the members of the convention the relation between the mechanical side of selling motor trucks and transportation, and what the mechanical side of the work can do to assist the dealer.

The Advisory Council in executive session on Tuesday, elected J. L. Costello, of Pittsburgh, president, and J. C. Conley, of Boston, secretary, of its organization. G. H. Covert and J. E. Pickens concluded Tuesday's session with an illustrated lecture on the Transportation and Engineering Schools.

## Factory Advertising Men Advise on Copy for Shows

New York, Dec. 10—Sam Miles, general manager of the shows conducted by the National Automobile Chamber of Commerce, has gone to Detroit for a series of conferences with factory advertising men to get their ideas on how best to conduct the advertising campaign

which will be put on by the N. A. C. C. in New York and Chicago at show time to demonstrate the utility and essentiality of the passenger car. This advertising will be very carefully prepared and will be designed to convince bankers and others that the motor car cannot fairly be classed as a luxury. The N. A. C. C. is getting the advice of various organizations interested in the industry, particularly the Motor & Accessory Manufacturers' Association, on the best policy to be pursued in writing the advertisements.

Most of the manufacturers are preparing for an extensive and intensive

## Farmer Becoming Heaviest Buyer of Trucks, Says Oil Company

CHICAGO, Dec. 10—The Standard Oil Co. of Indiana makes an argument for motor trucks in advertisements which it is running in Chicago newspapers. In speaking of the "new type of business farmer" in the ten states of the Middle West which "are well termed the bread-basket of the nation," it says:

*"The farmer of the Middle West is a business man who utilizes every labor or time-saving device to increase his profits. That's why the farmer is coming to be the heaviest buyer of motor trucks.*

*"At seeding time he hauls his seed to the field, thus economizing hand labor; at harvest time he hauls his grain, potatoes, and other produce, to market, and distance being a less prohibitive factor, is able to secure better prices; and all through the year he hauls his livestock and chickens to market and is able to deliver them in better condition and with a minimum of shrinkage.*

*"These are a few reasons why the farmer finds the motor truck profitable."*

advertising campaign at show time and their advertising staffs are hard at work on the preparation of copy.

## LUBECK BACK FROM ST. LOUIS

St. Louis, Mo., Dec. 4.—Major E. M. Lubeck, special sales and financial representative of the Diamond T Motor Truck Co. of Chicago, who has been acting as manager of the creditors' committee in charge of the affairs of the Martin Motor Truck Co., distributors of the Diamond T and Denby truck lines, has resigned and returned to Chicago. Both the Diamond T and Denby truck lines have been placed in the hands of local distributors by Major Lubeck, and the large quarters of the Martin company have been leased to the local branch of the Mack Truck company.

## Truck Dealers' Association in Cincinnati Joins Larger Body

**Becomes Division of Automotive Trades Organization—Strength Gained Through Merger**

CINCINNATI, Dec. 13—Plans for the affiliation of the Cincinnati Truck Dealers' Association with the Cincinnati Automotive Trades Association, whereby the truck dealers body becomes the truck division of the automotive trades association, were approved finally at a meeting of the automotive men at the Hotel Metropole. Charles B. Ratterman, president of the truck dealers, and other members of his association, are much pleased with the new arrangement, because of the added strength it gives.

"It means more simplified and direct organization in the local field in bringing about better legislation and other generally favorable conditions," President Ratterman said. "Besides, we will get the benefits of the state association which will come as a result of this action. Our work now should go forward more rapidly than ever before."

The Automotive Trade Association now is headed by Roy E. Faulkner, of the F. J. Santry Co., Nash dealers. The other officers are: Vice President, E. H. Silva; Secretary, Ralph Curl, and Treasurer, Harry P. Kelly. A. C. Mundew, retiring president, was named on the Finance Committee. The association plans to establish a manufacturers' division. Each of the eight divisions of the association will meet soon and elect division chairmen who will comprise the Board of Directors. Twenty-five new members were added at the annual meeting.

## Delaware's Largest Service Station Featured by Ramps

Wilmington, Del., Dec. 6—The new garage, sales and service building of the Wilmington Automobile Co., the largest and finest structure of the kind in Delaware, has just been completed and occupied by the company. The building has more than 100,000 feet of floor space. It is of fireproof construction, being built of reinforced concrete, and is four stories high, with windows as numerous as it was possible to place them, giving splendid light. One of the novelties in the construction is a ramp, with double roadway, rising at an easy grade from the Eleventh Street entrance to the third floor level, with a break at the second floor. Access to the fourth floor is given by another ramp from the third, on the west side.

The fact that Delaware Avenue, the most traveled motor boulevard in the city, merges into Tenth Street about the middle of the front of the company's property, giving the front an angular arrangement, has been taken advantage of in the design to locate the central bay there, which is the entrance to the office and show room.

## Industry in Detroit Makes Good Showing, Banker Says

### Comparison With Peak Production Not Unfavorable When Other Activities Are Considered

DETROIT, Dec. 8—President Emory W. Clark of First and Old Detroit National Bank addressing wholesale merchants at a dinner at the Board of Commerce declared the automobile industry was not shaky and would come through the readjustment period in good shape and said none of the companies in Detroit were causing any anxiety.

"It is said the industry is flat," said Mr. Clark. "That is true to an extent. In this district it is running at about 30 per cent of its peak production but that is a much better showing than is being made in silks, shoes and other industries. Mr. Clark said the banking situation was much improved and that banks are extending more credit than ever before contrary to current belief. He predicted easier money in February, but said it might be March or April before there would be a real increase in business.

### Waiting for Better Prices

The banks cannot do it all Mr. Clark said and insisted it was necessary for merchandise and labor costs to liquidate. He declared the larger manufacturers and merchants were not subscribing to the plan of the smaller ones in meeting low prices and said it was the former group that was seeking bank accommodations in lieu of turning their stocks into cash. Referring to the cotton growers and wheat farmers in holding their products for higher prices Mr. Clark said he could not see where the "angel" who would pay prices they wanted was coming from.

Liquidation of labor and merchandise would be followed in 1921 by improved business he said, and within three years when the foreign exchange situation has righted itself he predicted a great wave of prosperity.

## No Shortage of Parts If It Can Be Prevented by Manufacturers

New York, Dec. 9—A more optimistic feeling concerning the future of the automotive industry, than has been apparent for some time, was manifest at the monthly meeting of the directors of the Motor & Accessory Manufacturers' Association held here last Thursday. They appeared convinced that a turn for the better in business will come with the new year.

It was reported that many makers of parts and accessories are receiving substantial orders for deliveries running from the present to the last of March and it was said many additional orders are in prospect. The parts makers do not propose to be unprepared for the

resumption of business which they confidently expect. For that reason, they are making plans for replenishing their stocks of raw material and are getting their organizations in a position to start production on a large scale when the turn for better really begins.

The parts men realize fully that unless ample provision is made for the future business now in prospect, there may be a repetition on a small scale of the conditions which prevailed last spring when manufacturers were bidding against each other for supplies.

## Predict Sale Beforehand of All Trucks at Rochester Show

Rochester, Dec. 11—The Rochester Motor Truck Dealers' Association, at a meeting here this week, reported that they are taking many orders for spring delivery, and it was predicted that practically every truck which will be shown at the Rochester automobile show will be already sold and taken for delivery. They said that none of the manufacturers seem to be making any attempt to store up stocks in advance, which would indicate that trucks will be scarce when the demand increases.

The association went on record as favoring the appointment of Charles J. Hewitt as state highway commissioner to succeed Charles S. Greene. They also voted their support to the Rochester automobile show.

### VIRGINIA FOR GOOD ROADS

Richmond, Va., Dec. 11—Plans are now being made by the automobile dealers' associations and the Virginia Good Roads Association to ask the next General Assembly for a \$40,000,000 bond issue for good roads. At the general election an amendment to the constitution of the state was ratified by the people at the polls so that bonds could be issued for this purpose, the vote being 111,770 against 41,056.

### 92,736 CARS IN CONNECTICUT

Hartford, Conn., Dec. 10—Ninety-two thousand, seven hundred and thirty-six passenger cars were registered during the fiscal year ending June 30 in the state of Connecticut according to the report of the commissioner of motor vehicles. There were 132,337 operators at the close of the fiscal year. The fees collected amounted to \$1,816,809. This represents a gain of 23 per cent over the similar period a year ago. During the past three months \$182,285.42 was collected.

### NEW PARKING LAW IN CHICAGO

Chicago, Dec. 9—To relieve congestion in the downtown sections of the city, the city council at a meeting last night passed an ordinance prohibiting all parking of vehicles in the district between 7 a. m. and 6:15 p. m. on business days. The measure was opposed by the members of the Chicago Automobile Trade Association.

## Co-operation Between Oil and Automotive Industries Needed

### Secretary of California Chamber Recommends Closer Affiliation of Interests

SAN FRANCISCO, Dec. 11—Steps to bring about a closer co-operation between the automotive and the oil industry were taken at the general meeting of the California Automobile Trade Association held at Bakersfield last week. G. M. Swindell, secretary of the California Chamber of Oils and Mines, voiced the need for this closer association of these two great California industries, the interests of which are in many respects identical.

Appointment of a field secretary to work under the direction of State Secretary Robert W. Martland was authorized by the association, which transacted much business of importance to the organization. Over 250 delegates were in attendance and the two-day session proved a gala event for the city. Leading automobile men of Bakersfield aided in making the entertainment features of the gathering a great success.

The annual meeting of the association next year was set for June and will be held in Santa Barbara. Official reports of President George Haberfelde and of Secretary Martland were greeted by enthusiastic applause and were unanimously accepted. Mr. Haberfelde left immediately at the close of the convention to attend the conference of safety experts at Cleveland.

## No Announcement of Change In General Motors Policy

New York, Dec. 10 — No announcement has been made as yet of any change in policy in the management of the General Motors Corp., under the direction of Pierre S. duPont, who succeeded W. C. Durant as president last week. Mr. duPont is arranging his many other interests so that he can devote most of his time to the automotive industry but thus far has spent only one complete day in the offices of General Motors. He is thoroughly familiar with the corporation's business in its larger aspects but now is familiarizing himself with the details which his new position will compel him to take up. In this he will be assisted by the former president.

Mr. Durant has opened temporary offices in a Broadway building across the street from General Motors headquarters and will occupy permanent offices in the new building of the Gotham National Bank when it is completed early in the year. So far as can be learned, he has made no definite plans for the future and probably will not do so for the next three months. It can be said, however, that he still has large interests in General Motors and is not likely to divorce himself entirely from the affairs of that organization for some time to come.



## Asked to Lend Aid in Good Roads Program of Louisiana

### Industry Invited to Assist in Rewriting State Constitution—Comprehensive System Planned

NEW ORLEANS, La., Dec. 10—Among the most important matters to be taken up by the convention which has been authorized to rewrite the Louisiana state constitution next February, will be the construction and maintenance of a state-wide good-roads system, at a cost ranging from \$28,000,000, as provided in one plan, to \$35,000,000, as provided in another. Automobile manufacturers, distributors and dealers, motor leagues and other organizations of motorists have been invited to take part in the discussions at this convention, to present plans for a comprehensive good roads system which shall replace the patchwork now in existence, and to lend their aid to the construction and maintenance of the roads most necessary to be built first.

Gov. John M. Parker issued this invitation to the men of the automotive industry at a recent meeting of Ford dealers here, and the Motor League of Louisiana, the New Orleans Automobile Dealers' Association, the Jefferson Highway Association, and other organizations are now at work on plans to be presented to the constitutional convention, or to those delegates to that convention who will be leaders in the reconstruction of the highways of the state. The only question in the entire matter which will cause any argument before the convention will be the method of raising the money, one plan being to assess a general property tax, extending over seven years, and the other a twenty-year bond issue. Proponents of each of these financing plans are a unit on the fact that the state-wide road system must be built, and if either faction on the financing shows any gain of strength over the other, both have said they will unite to put the stronger project through.

One of the most active of the motorists' organizations in this work is the recently re-organized Jackson Highway Association, of which Col. T. C. Campbell is vice-president for Louisiana. The local branch of this association stands for the elimination of the parish roads, which form a patchwork of all but useless highways all over the state, and Col. Campbell is of the opinion that the work should be done by bond issue, and thoroughly supervised by engineers of the federal government.

### FARM SHOW IN OHIO

Columbus, Dec. 10—A farm and home convenience show will be a feature of the agricultural engineering program during Farmers' Week at the Ohio state university here from Jan. 31 to Feb. 4. Preparations are being made to accommodate 6000 visitors, which was last year's attendance. Twenty manufac-

turers will display the latest home water supply systems and lighting plants. efficiency tests being made much the same as has been done in previous years with tractors. A cross section of a farmhouse will show how much home conveniences may be used to best advantage. The domestic engineering laboratory which has a permanent exhibit of power washing machines, ironers, and other laundry apparatus will be in operation. As usual, over a dozen state agricultural organizations will hold their meetings during the week.

## University Holding Two-Day Tractor Schools in Kentucky

Louisville, Ky., Dec. 10—Extensive plans for tractor schools conducted by Earl G. Welch, farm engineer for the College of Agriculture of the University of Kentucky, have been arranged by uni-

## To Make \$17,000 Car

KANSAS CITY, Mo., Dec. 10—The U. S. Products Corp. of this city is planning to manufacture a car to sell for \$17,000. It will be equipped with a Curtis engine and front brakes and will have many new features. It will have over 100 hp. The first three cars of the company, according to present plans, will be finished in four months and during 1921 there will be produced 250 cars, representing \$4,250,000 worth of business.

versity officials, according to N. R. Elliott, leader of horticultural extension work of the university. These are the first tractor schools ever held in Kentucky.

A number of two-day schools already have been arranged for various parts of the state, Mr. Elliott announced. Mr. Welch works in conjunction with the county agents.

The program as outlined and county agents interested follow: Dec. 13 to 14, Bowling Green, Warren county, W. M. Rogers; Dec. 16 to 17, Russellville, Logan county, W. R. Whitlow; Jan. 17 to 18, Lagrange, Oldham county, G. Nance; Jan. 20 to 21, Louisville, Jefferson county, F. E. Merriman; Feb. 14 to 15, Bardstown, Nelson county, C. L. Hill; Feb. 17 to 18, Hodgenville, Larue county, J. W. Jones; Feb. 21 to 22, Hartford, Ohio county, M. L. McCracken.

### SHERIDAN DISTRIBUTOR APPOINTED

Chicago, Dec. 10—The Jans Lamke Motor Co., 1013 Davis Street, Evanston, has been appointed distributor of the Sheridan car along the north shore by C. H. Burke, president of the Chicago Sheridan Co. Dealerships will soon be established in Lake and Kane counties.

## Plant, After Being Closed for Two Months, Is Resuming Work

### Other Evidences of Activity in Industry Seen—Oakland Speeding Up Production

DETROIT, Dec. 10—Internal revenue collections in the first Michigan district on automobiles, truck and accessories for the fiscal year ending June 30, was \$58,675,094.21. Five per cent on automobiles yielded \$49,211,504.25; commercial cars, \$5,713,160.18; accessories, \$3,751,429.78. The value of cars, trucks and accessories on which tax was paid aggregated \$1,249,506,914.57.

The Oakland Motor Car Co., Pontiac, Mich., began on Wednesday making 75 engines daily and as rapidly as skilled labor can be called back plant production will be increased until the schedule of 100 automobiles daily and 150 engines is reached, the date having been set at Jan. 2. W. H. Maston, assistant manager, says that the resumption was due to improved demand and an outlook for steady increase. He said that the future would be governed entirely by conditions and no set schedule, though the present outlook gives assurance that consumption will take care of 100 daily.

The directors of the Maurice W. Fox & Co., Ford dealers, paid 2 per cent regular and 3 per cent extra dividend last week, making 18 per cent paid during the year 1920. The directors announce that the November business apparently will prove the largest of any month in the company's history.

Figures for the month now being compiled evidence returning confidence, which is shown in the resumption of operations by the Gale Manufacturing Co., Albion, Mich. The company furnishes castings and foundry supplies for many Michigan automotive plants and has been shut down more than two months as a result of the slump in the industry.

### SEPARATE MEETING FOR DEALERS

Boston, Dec. 10—W. J. Connell and J. L. McKone, who distribute the Overland line in this territory, took advantage of the meeting of the motor dealers at the Boston City Club to have all their dealers on hand and then to have a conference that same evening. There were more than one hundred present and motor conditions throughout the territory were discussed.

### MORE WESTINGHOUSE DEALERS

San Francisco, Dec. 10—Percy S. Scales, general manager of Mirk-Scales-Harford Co., Westinghouse batteries distributors for northern California, is back in San Francisco after a tour of the interior territory. As a result of his investigations, several important appointments of dealer territory in the northern part of the state will be forthcoming from the San Francisco headquarters for Westinghouse Batteries.

## Heavy Losses to Kentucky on Account of Its Bad Highways

### Extra Session of Legislature Urged to Provide Funds for Benefit of Roads

LOUISVILLE, Ky., Dec. 10—Bad roads cost Kentucky \$25,000,000 a year, to automobile owners \$10,000,000, and to others \$5,000,000, Joseph S. Boggs, state highway engineer, declared in an address before a good roads meeting in the Seelbach rathskeller this week.

The meeting was held under auspices of the Louisville Automobile Club, as the first move in its campaign to convince Gov. Edwin P. Morrow of the necessity of an extra session of the legislature for the benefit of good roads. The club favors a bond issue of \$50,000,000 to build the state highway system as outlined by the recent session of the General Assembly.

Mr. Boggs said that it is necessary to spend \$10,000,000 yearly to carry out the road program, but that only \$3,600,000 would be available for road purposes during 1921 from both state and federal funds. The state road fund available, he said, would be \$2,500,000. It will be necessary, however, to use \$500,000 of this sum to pay state aid debts, while \$300,000 will go for maintenance, according to Mr. Boggs' figures.

This will leave, he pointed out, but \$1,700,000 of state funds for building new roads and this is to be added to the \$1,000,000 expected from the Government. The total will build but 144 miles of roads, whereas about 3900 miles are needed, he asserted. Mr. Boggs said that the state revenue for roads comes chiefly from automobile license fees and the tax on gasoline added to \$600,000 from property tax for road purposes.

### MICHELIN SALES MANAGERS MEET

Chicago, Dec. 11—General trade conditions and sales and other policies are being discussed at the regular quarterly district sales managers' conference of the Michelin Tire Co. of Milltown, N. J., at the Congress Hotel here. The managers report a decided improvement in conditions and are optimistic as to the future. J. H. Michelin, head of the American Michelin interests, heads the delegation of Michelin executives from the factory. Others from Milltown are E. E. Connolly, treasurer; D. Bardin, sales manager; J. J. Rooney, credit manager; R. B. Bramwell, advertising manager; Theodore Voorhees, branch auditor, and R. W. Osborn of the Michelin disk wheel department.

### SEATTLE SETS SHOW DATES

Seattle, Dec. 11—At a meeting of the Seattle Automobile Dealers' Association, April 4 to 9 was set for the 1921 automobile show here. Tentative plans call for the most elaborate show ever held in the Northwest. Two of the city's largest halls, which are located across the street from each other, are to be con-

nected by a covered passageway running from building to building, for the purpose of providing sufficient space for a record number of exhibits that are anticipated. W. O. McKay, manager of the W. L. Hughson Co.; J. G. Fenton, of the Eldridge-Buick Co., and Fred W. Hill, of the Great Western Motors, together with Max Alsen, president of the dealers' association, and J. W. Coyle, secretary of that organization, are in charge of the arrangements for the show.

## Ford Dealers Against Order Throwing All Territory Open

Detroit, Dec. 10—Ford dealers in many sections of the country are much concerned over the action of the company in abolishing territorial restrictions on the sale of Ford products particularly in small cities and towns. While it is denied by officials of the company, there are well authenticated reports of vigorous protests being entered against the order issued last week by General Sales Manager Ryan under which it will be permissible for any dealer to solicit and sell in any territory without regard to other dealers.

Heretofore each dealer has been assigned a specific territory and protected with a commission on any car, truck or tractor sold in that territory. Territorial limits were fixed by the factory and usually were based on population, although no hard and fast rule was applied. Country dealers usually were given entire counties with exclusive rights. Dealers in large cities were given definitely defined areas with full protection.

## Ford Motor Co. Is Enjoined in Detroit Property Dispute

Detroit, Dec. 6—American House Wrecking Co. has been granted a temporary injunction in circuit court enjoining Henry Ford, Edsel Ford and the Ford Motor Co. from interfering with property which the plaintiff company alleged was wrongly taken from it by the Ford company. The property in question comprises the buildings of the River Rouge Naval Training Station where men were trained during the war for service on Eagle boats. The plaintiffs alleged they were given a contract by the government by which they secured the buildings for \$66,000 on condition that they be moved in one hundred days. The bid of the Ford company for the buildings, according to the petition, was \$10,000.

### ENDURANCE RUN ENDS

Houston, Texas, Dec. 10—The 3600 mi. endurance run conducted by the Southern Motor Manufacturing Association which carried two contesting Ranger cars through eight Southern states was won by Frank C. Love. The winner covered the distance in actual running time in 19 days, and consumed 20.2 miles per gallon of gasoline.

## Victory of Templar Followed Denouncing of Rumor Mongers

### Automotive Industry Sufferer Through False Reports—Deep Significance in Court's Action

NEW YORK, Dec. 10—The Templar Motors Co. of Cleveland is taking full advantage of the decision of Judge Levine in the Court of Common Pleas in refusing to grant a receiver upon application of a minority stockholder. The court scathingly rebuked J. W. Wilson, who brought the action, for making the "grossest kind of accusations against a perfectly solvent firm for the purpose of creating suspicion in the minds of the public concerning its affairs."

The Templar company is running large display advertisements in which it asserts that "American business and American institutions must be protected from the unscrupulous attacks of irresponsible people."

"The application for receivership against the Templar Motors Co. and the findings of the court in this matter, proving the company to be absolutely sound and solvent, have a deeper significance than a single victory by a single organization. It is rather a victory for American business and American institutions."

The decision in the Templar case followed closely a warning issued by William H. Remick, president of the New York Stock Exchange, denouncing rumor mongers. He warns the members that circulation of sensational rumors will be deemed an act detrimental to the welfare of the exchange and its members and points out that there is a state law which calls for the punishment of individuals responsible for the circulation of rumors likely to depress security prices.

The automotive industry has suffered as much as any other from the circulation by professional stock gamblers of reports designed to bring down the prices of stocks so they could sell short to their own selfish advantage.

### NEW A. C. BRANCH

Chicago, Dec. 10—A factory branch sales office and service station has been opened at 2448 South Michigan Avenue by the Champion Ignition Co., Flint, Mich., makers of the Champion A C spark plug. H. G. Neubauer has been appointed manager and will have as assistants A. E. Frank and Fred Leich.

### NEW NUMBERS IN DETROIT

Detroit, Dec. 11—All concerns doing business in Detroit or having correspondence in this city should immediately get the new street numbers of their correspondents. The new numbers go into effect on Jan. 1 and embrace many of the business as well as the residential areas of the city. Delays of 2 to 3 days will be caused in the delivery of mail by using the old numbers after the first of January.



## Car Thieves Use Abandoned Quarry to Dispose of Loot

**Salable Parts First Removed—Investigation by Insurance Companies Brings Vehicles to Light**

ELGIN, Ill., Dec. 10—If you have a quarry near your home, are temperamentally inclined to go prowling about over its floor and can acclimate yourself to a diver's uniform you may be able to uncover treasures such as were laid bare at a recent examination of an abandoned quarry near here. What was brought to light was not exactly in the nature of a jewel case, however, unless it could be considered such as revealing the disposition automobile thieves and unprincipled owners are making of cars, thereafter duly entered upon the police records of the home city as lost.

Despoiled of salable parts, reduced to the value simply of junk, in cases, many automobiles and trucks have been driven or hauled to the water's edge of this quarry and dumped into the deepest section of it in the hope that they would remain undiscovered until disintegration became so great that identification

had been removed. Tires were found in the watery tomb, placed there, apparently, until the excitement over their theft had subsided.

### TO REORGANIZE OHIO TIRE

Port Clinton, O., Dec. 10—Reorganization of the Ohio State Rubber Tire Co. is expected to follow the resignation of W. O. Bruess as president, his daughter, Miss Stella Bruess as treasurer and H. S. Ballard of Columbus as secretary. Their action followed complaints of stockholders against the management. The retiring officers have surrendered all the stock they hold in the company against which judgments amounting to more than \$20,000 have been taken. It is expected that a new board of directors will be elected and that they will be able to reopen the plant which has been closed for some time. The assets of the company are said to be approximately \$700,000, while the liabilities are only about \$150,000.

### CHICAGO AFTER CAR THIEVES

Chicago, Dec. 9—Energetic measures are being taken to curb automobile thefts in Chicago. The city council yesterday passed an ordinance which will require every owner and operator of a

## What Happens to Some of the Stolen Trucks



Rescuing the motor truck from a premature end of usefulness. All it needs to send it merrily on its commercial way is a new power plant which the thieves had selfishly removed before tipping the truck into the quarry

would be impossible. In the meantime insurance was collected.

Discovery that the quarry pond was being utilized for the interest of worn-out or stolen cars was made by boys in swimming, one of the lads, in making a long dive, striking the frame of a truck. The attention of insurance companies was directed to the quarry and an investigation was conducted. Powerful hoisting machines, operated by a windlass and cables, together with other necessary paraphernalia, were requisitioned. As rapidly as the divers made a discovery the men on shore pulled up and in. One truck so recovered had been stolen from its Chicago owner and the thieves had taken it to the quarry in order to cover up their trail. Another truck was found from which the engine and other salable parts

motor vehicle in the city to carry an identification card setting forth the owner's or operator's name, his photograph, his address and the license number and make of his car. On the back of the card will be spaces to be used by judges for the record of the motorist. The date of arrests for violation of the traffic rules, the charges on which the motorist appears in court and the disposition of the case will be set forth in these spaces. Motorists will be required to register at the police vehicle bureau.

### ST. JOSEPH TO HAVE SHOW

St. Joseph, Mo., Dec. 11—The dates for the automobile show for this territory have been set by the committee consisting of R. E. Traschel, Paul Polk and C. A. Kessler at Feb. 28 to March 5, at the auditorium.

## Tractor Dealers Preparing For Sales Battle In Spring

**Realize That Best Efforts Are Necessary and Show Determination to Use Them**

DES MOINES, Iowa, Dec. 12—Iowa's annual winter tractor show was held at the Coliseum here this week in connection with the yearly convention of the Iowa Implement Dealers'.

While the business depression which has hung over Iowa for the past ninety days as a result of the credit situation and the falling scale of prices for farm products was reflected in the attitude of the dealers, nevertheless the outstanding feature of the show was the quiet determination to see the thing through and enter the battle for business with the opening of spring. Sales conditions at the present time are practically at a standstill. Just now the Iowa farmer is in no mood to buy anything. The credit situation was enough of a handicap, but just when it was at its height came the break in the price of farm products and the farmer saw the crops which he had planted and harvested at the highest cost in years fall daily for weeks on the grain market.

There is every evidence that the dealers figure that the battle will require the best sales efforts that have ever been put forth in the tractor field and there is also evidence of a determination among the dealers to prepare themselves for it. At practically every session of the convention the big majority of the dealers were on the job to get what information they could from the speakers. More than 500 dealers were registered and about 1,200 farmers.

F. P. Mount, president of the Advance Rumely Co., one of the speakers, told the dealers that the present business depression is to be short lived and will be followed by a period of prosperity. Mr. Mount advised the dealers that greater production is the solution of part of the agricultural problems brought about by the high price of Iowa lands and the tractor will play a big part in bringing about this greater production.

### INSTITUTE 24 HOUR SERVICE

Chicago, Dec. 10—J. F. Jones, manager of the local branch, recently opened, of the Clydesdale Motor Truck Co., has inaugurated a day and night service for the convenience of Clydesdale truck owners, and has secured the services of Harry M. Keefer as service manager and Walter D. Glenn as sales manager. The building housing the branch is of brick construction and one story in height. Its primary aim is the rendering of service to Clydesdale truck owners in this territory, 10,000 sq. ft. of floor space being devoted to the service department. In addition to being a sales headquarters for Chicago and the surrounding territory the branch is a supply center for a considerable area in several states and carries \$55,000 worth of service parts in stock at all times.

## Duryea, of '95 Racing Fame, Is Exhibited in National Museum

**Experimental Car Built in 1892-93  
Taken From Storage in  
Old Barn**

WASHINGTON, Dec. 10—The second gasoline automobile designed and built by Charles E. Duryea between September, 1892 and September, 1893, has been rescued from oblivion in a barn at Springfield, Mass., where it had been stored for years, and placed on exhibition in the Smithsonian Institution here. It is in good condition except for minor damage caused by rain and snow which leaked through the roof of the old barn.

The car is a duplicate of the first gasoline automobile which was designed and built by Duryea between August, 1891, and September, 1892, except that it has a more powerful engine and correspondingly heavier and stronger parts. The car is a converted horse-drawn carriage of phaeton style.

The essential parts of the car remain very much the same as when first built. Easily loosened brass parts are gone, as is the floor carpet and cushions, the steering handle, wires, etc. Many parts are badly rusted from exposure but the wheels and steering gear worked without hitch as the car was drawn from the freight station to the museum.

Twenty-five years ago—Thanksgiving Day, 1895—the car won the Chicago road race for motor vehicles held under the auspices of the Chicago Times-Herald. Sixty cars were entered but owing to lack of time to complete the models and the snow covered course, only six started. Two finished, the Duryea and a Benz car entered by the Mueller Mfg. Co., Decatur, Ill. Later the Duryea carriage was exhibited in Barnum's circus.

The actual running time of the car for the fifty-five mile course was seven and a half hours, or about 7½ m.p.h. With delays for repairs which included a broken steering knuckle, the time consumed in covering the course was 10 hours, 28 minutes. The steering knuckle was repaired at a blacksmith shop near the route.

Other entries in the race were a Benz by the De La Vergne Refrigerator Machine Co., a Roger wagon by R. H. Macy & Co., an electric wagon by Harold Sturgess and an electrobat by Morris & Salmon. Duryea had hoped to complete one of his improved models for the race, but failing to do this entered this second car of his, which up to the time of the race, had run several thousand miles experimentally.

### NO TRUCK SHOW FOR DES MOINES

Des Moines, Dec. 14—The Motor Truck Dealers' Association has decided not to hold a truck show this year but dealers will display trucks on their individual salesroom floors during the week of the passenger car show in March. This decision was reached in part because space available for the annual automobile show is no larger than is

necessary properly to display passenger cars and in part to the general lack of interest in the truck show exhibited by attendants at the passenger car show in past years. The truck dealers also felt that they should not make any heavy investment in truck display this year in the face of farm crop price conditions which have all but wiped out the truck market for the time being.

### ALLEGED TIRE PRICES CONTROLLED

Washington, Dec. 10—Investigation by the Department of Justice of allegations that the large tire companies of the country have been involved in an unlaw-

## Million Mark for Ford Is Missed by 40,000

DETROIT, Dec. 10—In an effort to approach the scheduled million mark for year's production the Ford Motor Co. will continue in operation until the night of Dec. 24, the plant then to close for inventory and reopen Jan. 3.

The original plan was to have the plant closed Dec. 15. The company is now running better than 4,000 cars and trucks daily on a 5-day-a-week schedule, but will fall below the million program about 40,000 on the closing date, it was announced officially today.

ful agreement to control prices is well under way and specific action in connection with it may be expected in the near future. The utmost reticence is being maintained as to just what action is contemplated but there is reason to believe the proceedings will take their usual course.

## Philadelphia Committee to Consider Holding Truck Show

Philadelphia, Dec. 10—The twentieth annual Philadelphia automobile show will be held in the Commercial Museum building Jan. 15 to 22, under the auspices of the Philadelphia Automobile Trade Association. Additional space acquired this year will allow for the display of 285 cars with 277 square feet per car. A special feature of the show this year will be the automotive equipment section, to which will be allowed 4,110 square feet.

At a meeting of the proprietary members of the Motor Truck Association of Philadelphia, a show committee was appointed, consisting of O. W. Doolittle, chairman; Charles J. Swain, J. Henry Schumaker, Harry Ebert and H. O. Staehling. The committee was instructed to ascertain the whereabouts of a building sufficiently large to hold a motor truck show between Jan. 1 and March 1. This committee, when ready to report, will make known its findings at a special meeting of the board of directors of the association.

## Greater Efficiency Permits Reduction in Labor Charges

**Distributors Announce Reduction of  
25 Cents an Hour in Letter to  
Customers**

ST. LOUIS, Dec. 13—Labor charges have been reduced 25 cents an hour to customers of the Tate Motor Co., Dodge distributors in St. Louis. In announcing the reduction, Frank R. Tate, president of the company, sent the following letter to their customers:

"On and after Dec. 1, we will reduce all our labor charges 25 cents an hour, which we sincerely trust will be of interest to you and show our disposition to carry out the spirit of the times.

"In the last couple of weeks we have, by the installation of efficient machinery, by short cuts in operations and by the better co-operation of mechanical labor, who now recognize the necessity of holding their jobs by giving us and you an honest day's labor for their pay, been enabled to effect a saving as outlined above.

"It is our policy to give our owners the benefit of any savings or reductions we can effect, thereby minimizing the cost of operating a Dodge Brothers car. We value your good will above profits on repairs and trust that this will meet with your hearty approval."

## Pierce-Arrow Stock Raid May Be Investigated by Exchange

New York, Dec. 10—Governors of the Stock Exchange are considering a rigid investigation of a vicious bear raid yesterday on the stock of the Pierce-Arrow Motor Car Co. While the raid was in progress constructive traders declared it was time to make effective the recent warning that practices of this kind would be punished. The only basis for the attack on the stock was an unconfirmed report that the dividend would be passed. On offerings of only about 2,000 shares there was a break at one time of 18 points and the stock closed with a net loss of 9½ points. It opened at 76 and sold down to 59, from which it rose to 68.

Pierce-Arrow officials were amazed at the assault on the stock and declared there was no basis for it. The company is in excellent position and the earnings will far more than cover the preferred dividends, with six months' business on the books. This is not the first time in recent weeks that Pierce-Arrow has been the target for unscrupulous traders who have hammered down its stock.

### NEW LINCOLN DISTRIBUTORS

Milwaukee, Wis., Dec. 13—The William F. Sims Motor Co. of Milwaukee has been organized to take over the distribution of the new Lincoln Eight in the Wisconsin and Upper Michigan territory. Headquarters are in the sales and service building of the White Sales Co., distributor of White trucks.



## Death Takes Horace E. Dodge Less Than Year After Brother

**Both Members of Automobile Manufacturing Concern Stricken in New York at Same Time**

**D**ETROIT, Mich., Dec. 10—Within a few weeks of a year of the death of his brother from whom in life, whether at work or at play, he was inseparable, Horace E. Dodge, last of the Dodge Brothers, died at his winter home in Palm Beach, Fla., last night. His illness dates from the time he and his brother, John F. Dodge, were stricken in New York city with influenza while attending the automobile show. John F. Dodge died on January 16, 1920.

Mr. Dodge never fully regained his strength after the attack and had been in a serious condition for the last two months. Several weeks ago, improvement in his health being noted, he left for his winter home with his family.

Mr. Dodge was 52 years old and was born in Niles, Mich. He worked in his father's shop with his brother John until 1886 and then was employed with the Murphy Engine Co. of Detroit at \$18 a week. The two brothers went to Windsor in 1894 and became machinists for the Dominion Typograph Co., where their ability attracted the attention of Fred S. Evans, Detroit manufacturer. About this time the Dodge brothers invented the first ball bearing bicycle and with Evans organized the Evans & Dodge Bicycle Co. In 1897 they leased the Dominion Typograph Co. and two years later sold their interests in it to a Canadian concern for between \$5,000 and \$10,000.

It was while in the machine shop business in Detroit where they subsequently moved that the brothers began their career as automobile builders. When Henry Ford organized his present company in 1902 he urged the brothers to undertake the manufacture of engines, transmissions and steering gears in quantities. Much credit for the success of the Ford car is due to the Dodge brothers. Ford interested the Dodes in his company with the result that they bought \$5,000 worth of stock to be paid out of their profits on the manufacture of 650 chassis. The Ford engine was perfected and manufacture was begun under the combined direction of the three men. Later the Dodes bought the Ford stock owned by A. Y. Malcomson paying \$175,000 and thereby owning 20 per cent of stock in the Ford company.

In 1908 when the articles of incorporation were amended and the capital increased the Dodes received a thousand shares of \$100 par value each. In July, 1920, when Ford took over the minority holdings the two brothers received \$27,000,000 for their 2,000 shares and in addition their share of 1916 profits of the Ford company.

In 1914 the Dodge brothers began production of the Dodge car and severed active connection with Ford. A year later the Dodge company was eighth in



**Horace E. Dodge**

the volume of production of automobiles and fourth in 1917. The Dodge plant at the present time represents an investment of \$20,000,000; the buildings cover 75 acres and the average production is around 600 cars daily. During the war it built and equipped a munition plant said to have been the finest in the world costing \$10,000,000, covering 11 acres and employing 8,000.

The death of Horace Dodge will in no way effect the business immediately. F. J. Haynes, general manager who has been the virtual head of the plant since the death of John Dodge, is in bad health but his condition is not such as to preclude his continuation at the head of the business. Several times, however, during the last three years New York financiers have sought an interview with the Dodes in an effort to buy the plant or control and were always turned down. Detroit bankers are unanimous in their belief that the same interests will renew their efforts but see no possibilities of removal from Detroit. The company is in good financial condition; does not owe local banks anything and made arrangements a few weeks ago for a loan of \$10,000,000 but never availed itself of it.

## Upward Trend Seen In Industry

*(Concluded from page 13)*

equilibrium can be restored is the wage question. High wages have a large bearing of costs of manufacture and the wage earner must accept the inevitable reduction before the cost of living can go back to anything like the pre-war level. The laborer is unwilling, naturally enough, to accept a cut in wages before he can be shown that there has been a correspond-

## Organize Club to Which Only Hupmobile Owners Can Belong

**Dealers Start Social Body With Instruction in Care of Cars to Follow**

**S**ACRAMENTO, CALIF., Dec., 10—A Hupmobile Club, composed of owners of Hupmobiles in Sacramento and the surrounding territory, has been organized here by Rice & Forrest, dealers in that car. The club is not only social in nature, but is intended as well to instruct owners in the care and repair of their automobiles.

The first meeting of the club was held last Sunday, when a score or more of Hupmobiles motored into Placer county to cut the red Christmas berries which abound in the foothills at this time of the year. Rice & Forrest sent a truck with tables and chairs for the lunch, and carried such lunch baskets as the car owners themselves did not wish to take.

The club is but temporarily organized, but officers are to be elected and a permanent name chosen at the next meeting.

Rice & Forrest intend, as a part of the activities of the club, to have an expert mechanic lecture on the care of the Hupmobile, at least once a month, and oftener if the club membership desires. A Hupmobile will be used in illustrating the lectures.

"We don't want to be known in the club's activities, any more than other members," the firm has announced. "We want the club to manage its own activities, and to choose its own name, as far as that goes. We only insist the membership must be limited to the owners of Hupmobiles."

ing drop in the cost of the goods he has to buy.

Notwithstanding all the unfavorable elements, however, the United States should congratulate itself upon the fact that it is coming through the post-war period with so little of disaster. The dislocation of industry has been much less severe than might have been expected and it is preliminary to a long period of prosperity. This prosperity will be less spectacular than that which came with the war and immediately after the armistice, but it will be built upon a solid foundation and it will last—unless the world is shaken by another great war.

The automotive industry will weather the storm with flying colors and it will have its full share of the harvest which is to come. But to reap its rewards it must be conducted along sane and conservative lines and the men engaged in it must work hard if they are to prosper. All they can do now is to strike hard for all the business available, for there is more of that business than appears on the surface, and hang on to await the dawn of a brighter day. Dawn is coming and it probably is not far away.

## Concerning Men You Know

John J. Kroha formerly with the paint engineering department of the Patton Paint Co., Milwaukee, has joined the forces of the W. E. Seymour Manufacturing Corp., Milwaukee, makers of pistons and piston rings, as secretary and sales manager.

Earl W. McGookin, after an absence of two years, has rejoined the William R. Johnston Manufacturing Co., Chicago, manufacturers of plate glass window curtains, as factory representative in Michigan and Ohio.

Clayton R. Burt, for the past three years general manager of the Russell Motor Car Co., has been appointed general manager of the Willys-Overland Co., Ltd., Toronto, Ont.

L. E. Gibson, district manager for the Acme Truck Co., of Detroit, for the New Orleans territory, is moving his official residence and headquarters from Augusta, Ga., to New Orleans. The Acme Truck Co., announces it will open a branch office for territory including Alabama and Mississippi, under the larger office in New Orleans.

J. W. Kerr, for the past seven years South American representative of the Firestone Tire & Rubber Co., has become associated as a partner in the firm of Watson & Co., representatives of the Ford Motor Co. and the Henry Ford & Son Co., of Dearborn, Mich., in Buenos Aires and Rosario, Argentina.

William E. Carney, recently wholesale manager for the A. C. Hine Co., Hartford, Conn., has resigned and joined the Buick interests in Springfield, Mass.

F. W. Abbott, who has been connected with the rubber industry in a sales capacity for many years, has been appointed by the India Tire &

Rubber Co., distributor for the Minneapolis territory.

Charles Melhado, who has been in charge of export sales for the Bethlehem Motors Corp. has been entrusted with the direction of domestic sales as well, taking over these duties from Roy S. Davey, who has resigned as Bethlehem sales manager. With this appointment it has become known that the Bethlehem sales force is to be augmented in the field by both a field supervisor and a financial man.

H. J. Holmes has been appointed Sales Manager of the Tri-State Motor Sales Co. at Memphis, Tenn., distributors of the Lincoln, Chalmers and Maxwell trucks.

C. B. Harvey has been promoted from manager of the used car department to assistant manager of the truck sales department of the Packard Motor Car Co. of Missouri, St. Louis, Mo.

C. W. Couch, until recently sales manager of the Ford-Clark Co., Cleveland, has formed a selling organization under the name of C. W. Couch & Co. with headquarters in Cleveland.

F. H. Vermillion, manager of the Miller school of tire service at Akron, Ohio, spent several days in Milwaukee this week. He addressed a regular meeting of the Milwaukee Tire Dealers' Association on Thursday evening, Dec. 9.

J. L. Adams has been made manager of The Miller Rubber Co. branch at Houston, Texas. L. Crain, traveling salesman out of the company's branch at Houston has been appointed manager of the San Antonio branch.

S. M. Barber, salesman, has been appointed manager of the Grand Rapids branch.

## Manufacturers Against Plan To Hold Chicago Truck Show

Chicago, Dec. 10—Only two replies received from twenty-nine members of the Motor Truck Manufacturers' Association in response to a letter of inquiry sent out by David Thomas, general manager, are favorable to holding a truck show in Chicago this year. Mr. Thomas asked the manufacturers if they would exhibit their products providing a show was staged. All but the two said they would not.

This puts an end to all prospects of staging a truck show here until the spring, at the earliest. It has been felt that such a display should not be made during the winter months unless it could be held at the same time as the passenger car show. Obstacles to the plan of holding a simultaneous exhibit arose from the fact that there was no available space to house trucks, the Coliseum and the First Regiment Armory both being in commission in connection with the passenger car show.

To determine definitely how the manufacturers felt and whether or not there was a recent change in sentiment, Mr. Thomas sent out his letter of inquiry to which replies have just been received.

### FINANCE COMPANY IN CANADA

Winnipeg, Man., Dec. 10—Interest will be aroused in trade circles by the announcement of the organization for Western Canada of an automobile finance corporation headed by A. B. Hudson, K. C., as president and directorate which in-

cludes the names of E. W. Kneeland, A. R. Davidson, R. T. Evans, Sir Douglas Cameron, Andrew Kelly and J. G. McGavin as vice-president of the company. W. W. Evans, general manager of the Canadian and General Securities Co., Limited, will be managing director. The company has been incorporated with a capital of \$3,000,000.

### STORAGE FOR 250 CARS

Buffalo, Dec. 11—Hornell, N. Y., is to have one of the largest and most modern garage and service stations in western New York. The Auto Service Co. has purchased a site and will soon begin the erection of a \$100,000 garage. There will be storage space for 250 cars in addition to large service and accessory departments.

## Dealers to Aid Advertising Campaign for National Shows

New York, Dec. 4—As an indication of the immense attendance promised for the New York and Chicago national shows, S. A. Miles, manager, in a letter to exhibitors, declares that demand for exhibitors' invitation tickets to the New York show has already doubled that of last year, and the Chicago requests have increased 60 to 70 per cent.

To further arouse popular interest in the two national shows, Mr. Miles has requested all exhibitors to include in their advertising copy, and to request all their dealers also to include, a line similar to the following:

"We shall exhibit at the New York show, Grand Central Palace, Jan. 8 to

15." In the Chicago district the line should carry the Chicago show notice, at Coliseum and First Regiment Armory, Jan. 28 to Feb. 5.

### RAY BATTERY IN NEW PLANT

Ypsilanti, Mich., Dec. 11—Ray Battery Co., formerly of Detroit, is in production in its new factory and with the completion of the work of installing machinery a schedule of thirty a day by the first of the year has been laid out. The factory is equipped with all the speed-up machinery necessary to maintain production schedules according to President R. R. Fisher.

## Coast Garage Lien Law Upheld at Convention in California

Sacramento, Calif., Dec. 6.—A uniformed highway "motor officer," to replace the "speed cop" of today was demanded in resolutions passed by the California Automobile Trades Association at its semi-annual convention in Bakersfield. The resolutions cite that the present "speed cop," in disguise as a civilian, waits for his prey and takes no account of circumstances when making arrests after sallying forth from ambush. Such a law will be demanded of the State Legislature this winter, it was agreed.

The convention also went on record as favoring the present lien law, which permits garages to hold cars until repairs have been paid for. The movement to amend this law was condemned unanimously.

The next convention will be held next April, in Santa Ana, when officers are to be elected.

### DODGE DEALERS FINANCED

New York, Dec. 10—The Bankers Commercial Security Co. of this city which hitherto has financed only truck dealers, has entered into a contract with Dodge Brothers Motor Car Co. to finance Dodge dealers. The company is taking up cars for dealers both on the storage and retail plans. Dodge is now working three days a week, making 625 cars a day. Reports of the number of completed Dodge cars in the hands of dealers are said to be much exaggerated.

### TRUCK PLANT CUTS PRODUCTION

Akron, Ohio, Dec. 10—In explanation of the reason for countermanding the order for an increase in production at its motor truck factory here and ordering a decrease it was stated at the office of the International Harvester Co. that orders for motor trucks which had been booked are being cancelled at a rate sufficient to warrant the new order. The plant can turn out one hundred trucks a day and less than fifty cars are now being made.

### INCREASE IN LEE TIRE SALES

New York, Dec. 10—According to the report of the Lee Rubber & Tire Corp., sales for the nine months ended Sept. 30, 1920, were \$6,204,586.43 as compared with \$5,583,993.23 for the whole of the previous year.



## Association Planning to Make Car Theft More Serious Crime

### Appeals to District Attorney to Curb Activities of Organized Band of Thieves

SACRAMENTO, CALIF., Dec. 10 — Aroused by the increasing activities of what appears to be an organized band of automobile thieves, the Motor Car Dealers' Association of Sacramento, has appealed to District Attorney Hugh Bradford to take some steps to curb this particular crime. J. K. Flynn, president of the association, brought the matter to a head in a recent meeting of the association, in which he declared that automobiles are being stolen in Sacramento at the rate of two a day, and many are not being recovered.

"Of course," he said, "many of these cars are stolen through the carelessness of their owners, but in many cases they are taken from private and even public garages, and their disappearance leads to the belief there is an organization back of the thefts."

The activity in car stealing, which has gone far beyond the "borrowing for joy riding" stage, may lend color to the story told in Spokane, Wash., recently, by Frank Allen, alias Earl Dawson, who said he was a member of a ring which was operating in California, Oregon and Washington, stealing cars and rebuilding them. He named a Marie Allen as head of the ring, and said the activities of the thieves centered at a point south of San Francisco.

The Motor Car Dealers' Association here plans to have a bill introduced in the session of the Legislature here in January, making the theft of an automobile a more serious crime. Charles J. Chenu, superintendent of the Motor Vehicle Department, already has working agreements with Nevada on the east, and lower California on the south, making the recovery of cars more easy, but no such arrangements has as yet been made with Oregon on the north.

### MARION SHOW A SUCCESS

Marion, Ind., Dec. 13—The show held by the Marion Auto Trades Association at the South Adams Street Hall was a huge success. A musical program was a daily feature and the show ended with a dance for the general public.

## Death Takes Charles Bernice

### Ames, Automobile Publisher

New York, Dec. 11—Charles Bernice Ames who died here yesterday after a brief illness was connected with the automobile publishing business for more than twenty years. In this field he was first associated with Horseless Age as advertising manager, having been persuaded to take up the work by his former college mate, E. P. Ingersoll, then publisher of that magazine. Mr. Ames previously had been engaged in teaching, first at Rutgers College and later at De Witt Clinton high school, New York.

After several years with Horseless Age he became manager of Motor a month or two after that publication first appeared. Later he was also advertising manager of Motor Boating. He remained with Motor and Motor Boating until 1909 when he bought part ownership in Horseless Age, Mr. Ingersoll having sold out and retired. In 1915 with another change of ownership of Horseless Age, Mr. Ames returned to Motor as publisher, resigning about three years later to become vice president of the Motor Life Publishing Co.

Mr. Ames was born at Port Edward, N. Y., in 1865 and was graduated from Williams college with the class of '85. He leaves a widow and a married daughter, Mrs. Catherine Ames Pattison.

### ALLEN RECEIVERSHIP TO REMAIN

Columbus, O., Dec. 10—Stockholders and creditors of the Allen Motor Co. have decided to make no attempt at present to lift the receivership because of the unsettled conditions in the business world. William C. Willard and George A. Archer will continue as receivers. The company has been successful under the receivership and it is expected the stockholders will take it out of the hands of the court as soon as general conditions become more satisfactory.

## Prices of Kelly-Springfield

### Trucks Cut by Hare's Motors

New York, Dec. 13—Following very closely the taking over of the Kelly-Springfield line by Hare's Motors, Inc., announcement is made of a reduction in the prices of Kelly-Springfield trucks.

"The price reduction," says the announcement, "conforms with the Hare's Motors policy of meeting the spirit of the times and doing everything within its power to hasten a return to normal business conditions. A general reduction in prices is the only thing that can sufficiently increase the purchasing power of a dollar to a point where there will be sufficient money to properly finance the business needs of the country. The new schedule is based on the anticipated reduction on the cost of manufacture which will be accelerated just as fast as other manufacturers take the initiative."

The new prices on chassis, f. o. b., Springfield, Ohio, which will take effect immediately are as follows:

	Old Price	New Price
1½ ton .....	\$3,000	\$2,900
2½ ton .....	3,500	3,250
3½ ton .....	4,650	4,200
5 ton .....	5,150	4,900
6 ton .....	5,500	5,100

### LICENSES FOR DRIVEWAY CARS

Chicago, Dec. 11—Through the action of the Secretary of State of Michigan forbidding the use of paper tags, "Official Transit Permits," it will be necessary for each car in a driveway originating in or passing through Michigan for Chicago to be equipped with a set of Illinois dealers' license plates.

## Transportation Show to Have Almost National Importance

### Attendance Will Be Drawn From Most Highly Developed Motor Truck Field in Country

NEW YORK, Dec. 11—Truck registrations figures for the years 1912 to 1920 show that the Motor Truck Association in determining to stage a highway transportation show in New York from Jan. 3 to 8, will draw an attendance from the most highly developed motor truck field in the United States.

New York City with an estimated registration of 74,000 trucks in 1920 is the center of the entire motor truck world. In three years the number of trucks in this city alone has increased about 31,878 or approximately 75 per cent.

New York state alone with about 110,000 trucks registered in 1920 has approximately one-eighth of all the trucks registered in the United States and more than all the trucks in service in the British Isles. Since 1912 the truck registration has increased from 7,606 to its present proportions, the total including all commercial vehicles ranging from light delivery models to the heavy duty trucks.

Persons familiar with the transportation situation in New York express no fears that the market has been oversold and are confident that the increase in users will be fairly proportionate to the increase in the past decade. This ratio of increase would provide a market for 66,394 trucks in the next nine years exclusive of the replacement market.

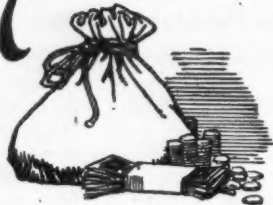
It is expected that the transportation show will draw to the Twelfth Regiment Armory and the First Field Artillery Armory, where it will be staged, an attendance not only from the city and state alone but also from New Jersey, Connecticut, Pennsylvania, Massachusetts and Rhode Island, thus giving it almost national importance, and increasing the market to which it will appeal, to approximately one-fourth of all truck users in the United States.

## Mid-Winter Race Meet Will Be Held During San Antonio Show

San Antonio, Texas—At a recent meeting of the San Antonio Automobile Trades Association and the officials of the San Antonio Speedway it was decided that the mid-winter race meet of the speedway of motorcycles and automobile races would be held on Jan. 16, 17 and 18 to come during the dates of the San Antonio automobile, truck and tractor show which will be held from Jan. 15 to 23 inclusive.

The San Antonio speedway is a two mile dirt course which is just being completed under the direction of Noah Smith, and it is intended to hold a race meet each year during the winter which can be done on account of the wonderful climate here. The course is very fast. The race meet will be unsanctioned.

# A Department of BETTER BUSINESS



Conducted by Ray W. Sherman

## Make It a Year 'Round Business—Dull Months Are Old Fashioned

**H**ORACE C. HEISEY, of the Heisey Tire & Rubber Co., one year and six months ago opened as a tire distributor in a new location. He had left his position as mechanical superintendent for a large automobile company to become Cincinnati dealer in a new make of tires.

"My first year was a good one for all tire dealers," said Heisey. "I had plenty of business, but I knew the prosperity wasn't going to last. Therefore I began to look around for another specialty which would keep sales alive the year 'round. I didn't want my business to become a seasonal one. I wanted no slack seasons. I took on a line of seat covers, radiator and engine covers and tire covers. I found these profitable.

"The radiator and engine covers have their inning during the fall and winter months. This business takes up the slack season in the tire business. I reach my customers through post-cards, reminding them in a striking way that it is time to take precaution against

freezing radiators. My windows also, at this season, push these covers."

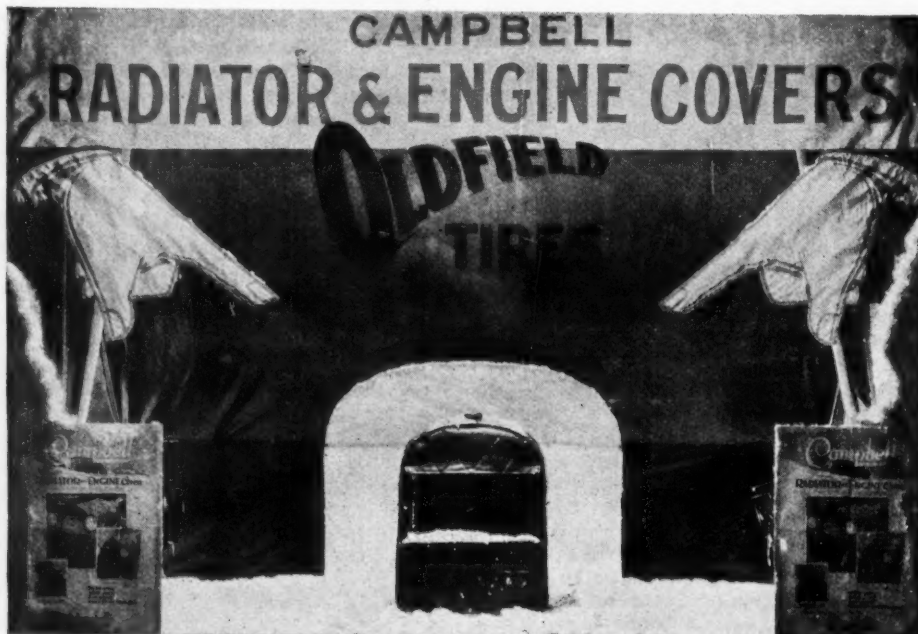
## Cash in On the Christmas Spirit

Because they are "gifts that no stocking will hold," Strong Motors (Inc., Rochester, N. Y., is advertising used cars for sale in the second annual Christmas sales campaign as "Christmas Cars at After-Christmas Prices." Owners are advised to do their "Christmas shopping early" with the result that sales are on the upward trend and business is showing a decided improvement.

## Sensible Salesmanship

When a prospect enters the salesroom of the Harrington Hudson Co., Hartford, Conn., he receives a number of very good impressions. To begin with he does not find a half dozen salesmen falling over themselves to reach him first.

## Concentrating All Attention on One Article



A window display of radiator covers in the Heisey Tire & Rubber Co., Cincinnati, one of the methods this dealer employs to promote sales. By pushing winter necessities, Heisey has built up a profitable business in a year's time

On the contrary, some one salesman will learn just what the prospect has in mind and will tell the story tersely and forcibly as to why Hudson and Essex are good values. Nor is the customer given to understand that there are but two cars in the country, Hudson and Essex, for the H. H. men know there are others and are frank to say so. One decidedly good impression gained by the prospect is that the organization from the top to bottom is human and sincere which one feature has been a factor in the success of the concern.

## Plan Your Action Each Day

"Whether a salesman is working on a straight commission, straight salary or a combination of both," says S. E. Ackerman, sales manager of the Franklin Automobile Co. of Syracuse, N. Y., "his time is his best asset and his success depends on how he conserves and utilizes his working hours.

"There are always a few fellows in every line who are constantly straining their eyes looking for reasons why business should be slow instead of straining them looking for business that is always to be had.

"Your own time is your own best asset. The man who starts out behind time in the morning has buckled a handicap on himself that is hard to overcome.

"One of the biggest self-improvement items in the world is to figure out a system for your daily activity and then work your system. The greatest handicap to results with most salesmen is their lack of definite goal."

## Sell Oil and Gasoline Together

Many customers stop for gasoline and do not think of buying any cylinder oil. But if it is in sight they will be reminded of it, and will often buy a quantity besides the amount needed in the crankcase at the time.

By obtaining a number of quart bottles and keeping them filled much running back and forth is avoided. Make a carrying box with a handle and carry out ten or twelve quarts at a time. No funnel will be required on a good many cars as the bottle may be inverted over the oil filler and the neck inserted in the breather pipe.—R. Wayne Taylor, Marionville, Mo.



# He Doesn't Try to Do It All Himself

ARTHUR MECHANIC, an accessory dealer in Cleveland, and Adam Beltz, a garageman of the same city, have been declared prize winners in their respective classes in a window display contest that was conducted by the tire and accessory division of the Automotive Association of the Cleveland Chamber of Commerce.

This contest was the first one of a series in a better merchandising campaign that is being conducted by the association. The winners in their competition were given first class round trip tickets to the Fourth annual convention of the Ohio Automotive Trade Association in Cincinnati December 7-8-9th.

The universal excellence of the windows displayed made it difficult for the judges to determine any particular window which stood out as being materially better than any other window entered.

In selecting Mechanic for the winner in the accessory dealers' class, the general exterior neatness of his store building was considered, as well as the actual display. Both men had seasonable displays, set off with a touch of red which was selected because it gives a tone of warmth. Tires with anti-skid chains in place were placed in both windows. Attractive winter rugs were shown, as were radiator covers and a few brands of standard oils and greases. Both men laid emphasis on the fact that the window must not be crowded, and that a certain idea must be played up strongly.

Mr. Mechanic, one of the prize winners, borrowed \$150 fifteen years ago to start in the bicycle and automobile accessory business. He had no experience in the business. Today a two-story business block which he acquired out of the earnings of his business is a fitting evidence of his success.

How did he do it?

Mechanic says, "service and work."

"What success I have had I feel is due to the fact that I have been careful in selecting merchandise, which is backed by reliable manufacturers, and which we honestly can recommend. At first I made the usual mistake of trying to do everything myself from washing windows to purchasing, selling and collecting. Since I have thrown away the

## Why Arthur Mechanic Makes Big Money Selling Accessories

*HE is careful in selecting merchandise. It must be backed by the manufacturer so that he may honestly recommend it to his customers.*

*He does not try to do everything himself but rather devotes his time more profitably to management.*

*He turns his stock over six times a year.*

*He keeps a big stock and has it clean and well arranged.*

*He finds price cutting does not pay and goes after business on a basis of quality.*

*The story on this page of his success may contain helpful suggestions.*

*Read it.*

chisel and hammer and devote my time and energy to the management of the business, I have more time for business building, selling and advertising plans.

"When I first started, I allowed myself to be talked into buying some unknown brands on account of the larger profit to be made, but I soon found that I had capital tied up in slow moving stock. Now I carry only popular brands which are in demand and I turn over my stock six times a year. I have found that it pays big to have a clean, orderly, well arranged store.

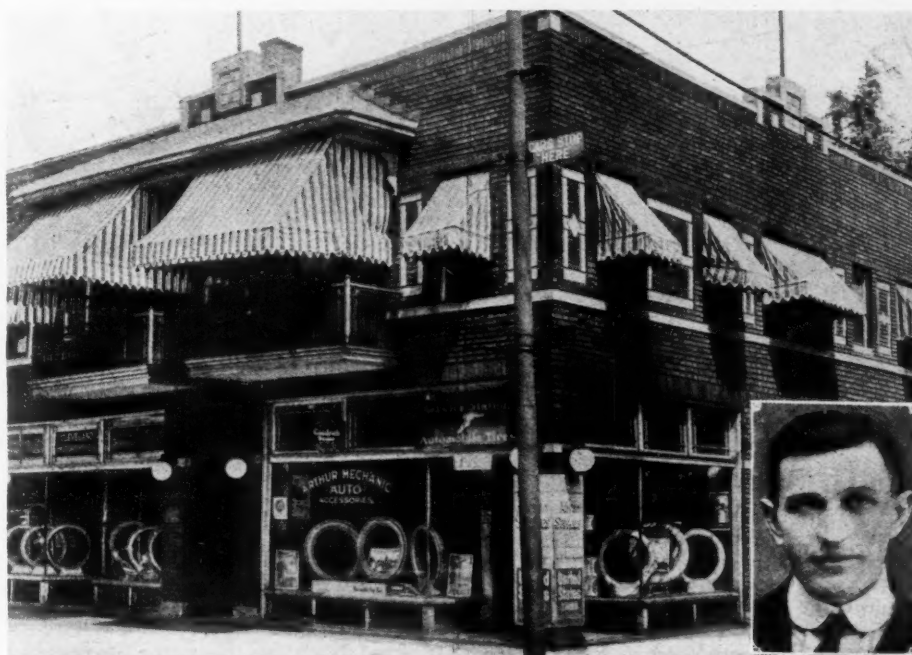
## Arthur Mechanic Finds It More Profit- able to Devote His Time to the Planning and Management of His Accessory Busi- ness.

"The tendency at the present time is price cutting, and I find that it does not pay. We do not appeal for business at cut prices, we go after it on the basis of quality merchandise.

*As the countenance is the index to the character of man, so the window display is an index to the character of the store. No one likes a gloomy-faced man and a gloomy display window does not attract.*

Mr. Beltz, the other winner, has found that an attractive display window helps the garageman. *Let your display window run down and your business will go down correspondingly.* Beltz changes his window display weekly. The frequent changes gives the pedestrians something new to look at and they are on the alert for changes.

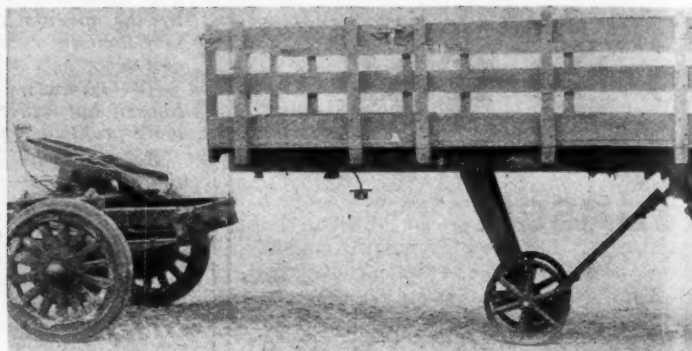
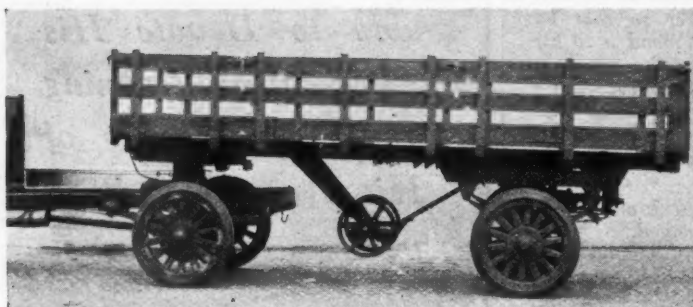
## Good Service and Attractive Display Built It



Fifteen years ago Arthur Mechanic started in the accessory business with \$150; today he owns the two-story building and business above. The window display in this view is not the particular one which won the contest, but is evidence that the window is kept attractive at all times

# Coupling Without Driver Leaving Seat

*Miami Coupling Device for Semi-Trailers Hitches Automatically—Fan Shaped Plate Allows Wide Margin*



Two views of the patented Miami automatic coupling device showing the simplicity of its action

A PATENTED automatic coupling device will soon be put on the market by the Miami Trailer Co., Troy, Ohio.

In the operation of the new semi-trailer the driver, without leaving his seat, can couple and uncouple the truck instantly, the construction of the automatic device at the same time being abso-

lutely fool-proof in that no mistake or misjudgment of the driver could have the effect of dumping the load or damaging the trailer. This makes possible and convenient in inter-factory and inter-terminal hauling problems, the application of the shuttle system of transportation whereby one truck handles two

or more trailers without the loss of a minute's time while loading is being done.

Side rock is eliminated in the new semi-trailer by reason of the operation of the fifth wheel which pivots laterally on the traction ball center and two friction shoes in circumference. Shock springs take up the jar on the roadways, protecting and prolonging the life of the truck. The fifth wheel base is adaptable to any truck frame without any adjustment being required.

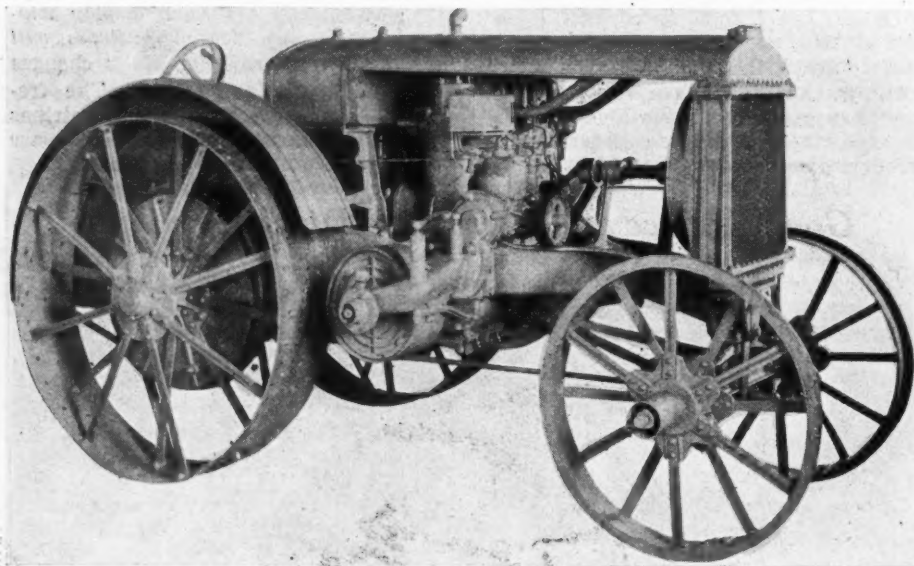
The fan-shaped entrance permits coupling of the trailer at any angle, teeth in the fan-shaped plate allowing pick-up no matter at what angle the truck is backed into the trailer. The coupler engages itself automatically behind the traction boss on the upper side of the fifth wheel when it is engaged fully in the middle section.

## Disengages Automatically

In uncoupling the automatic coupler is depressed by a trigger, operated by a cable from a hand wheel at the driver's seat. When the coupler is depressed the truck leaves the trailer and the jack drops automatically into carrying position beneath the trailer, the jack reaching the carrying position before the trailer is released fully from the truck's fifth wheel.

In coupling the truck is backed beneath the trailer, the traction boss riding over the coupler deflects it and when the traction boss has passed, the coupler springs into position.

The cable operating the automatic jack lift is engaged automatically between the fingers of the segment on the rear of the fifth wheel and the jack is hoisted into traveling position as the coupling is being made. Should the jack wheel drop into a depression there is sufficient pick-up in the fifth wheel to raise the trailer onto the truck and on a bump in the road a series of teeth in the rock holding the jack carriage automatically locks the jack in position to conform to the road surfaces



## Minneapolis Tractor Ready in Spring

A new four-plow tractor which will handle four 14 in. bottoms under average plowing conditions is now going into production at the plant of the Minneapolis Threshing Machine Co., Hopkins, Minn. This tractor weighs 6000 lb. and has a low gear speed of 2 miles per hour, high gear speed of 2.7 miles per hour with a normal motor speed of 775 r.p.m. The motor is a 4-cylinder vertical valve-in-head with 4 3/4 in. bore and 7 in. stroke. The extreme length of the tractor is 11 ft., width 6 ft. 2 in., wheel base 6 ft. 8 in., drive wheels 54 in. high, 12 in. face, and front wheels 36 in. high, 5 in. face. Hyatt roller transmission bearings are used and the belt pulley bearing is a double self-lining S. K. F. ball bearing. Every gear is enclosed in an oil tight dust proof housing. Even the steering worm is in the transmission case. Standard equipment on this tractor includes the Dixie magneto, Bennett oil cleaner and Kingston carbureter. The front axle is of the automobile type. One clutch controls the power and a foot brake is part of the regular equipment and operates on the reverse shaft. This tractor will be ready for spring delivery



# Law in Your Business



By Wellington Gustin



## The Garageman's Legal Responsibility for Frozen Radiators

RECENT lawsuits indicate that there is a woeful lack of knowledge on the part of garagemen who rent storage space without service as to their responsibility to car owners. The tendency is, of course, to evade all responsibility but nevertheless the law fixes certain duties upon the garage keepers which they are bound to respect in the absence of express contracts to the contrary.

What do you think a garage man should do with reference to draining the radiator of a stored car in cold weather even though the car owner pays only the storage rental which does not include any service?

Garage keepers in a western city, through their association or league, have decided not to assume any liability covering contingencies of this kind. By concerted action they are attempting to establish a custom which says that the only liability of a garage keeper on a straight storage contract shall be for damages to a car by external forces in the garage such as collisions and that the freezing of a stored car through failure to drain the radiator shall not be chargeable to the garage keeper.

### LEGAL RELATION

The legal relation of the garage keeper to the car owner is that of bailee and bailor, with reference to which the law is laid down in a hundred weighty volumes. To the layman let it be said that when one person delivers a thing to another to keep for him and pays him for this keeping, then the transaction is classed as a bailment for the mutual benefit of the bailor, the car owner in this discussion, and the bailee, the garage keeper. To these parties the law attaches certain duties and responsibilities.

The legal responsibilities of a garage keeper are ably stated by Huddy in his work on automobiles but unfortunately it is stated only generally and does not cover the subject of frozen machines. Huddy says:

"A garage keeper storing the car of another for compensation is classed as a bailee for hire, and as such, he is bound to furnish reasonably safe accommodations and to exercise reasonable care and prudence to keep the machine in a safe

### Tell Us Your Legal Problems

*SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. MOTOR AGE presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty points as may be submitted to him.*

manner. If guilty of negligence resulting in injury to the machine, he may be charged with the damage. The liability of a garage keeper for hire is not affected by reason of the knowledge of the owner as to the place where the property is kept. Its acceptance by the garage man imposes on him a duty of exercising due care for its safety and protection."

Lawsuits resulting from frozen radiators and motors are sometimes defended by showing that it is not the custom to drain radiators in certain sections of the country due to climatic conditions. In the East and Middle West public garages are heated and it might be negligence chargeable to the garage keeper to permit the heat to run below normal. On the other hand, the question often arises if it would be negligence to fail to anticipate an unusual cold snap which would freeze radiators in spite of ordinary precautions, although the abnormal cold might well be anticipated and the freezing avoided by manual manipulation of the car's draining equipment. In the far West garages are not usually heated at all and the question is less complicated.

The supreme court of Massachusetts, in the case of Stevens vs. Stewart Warner Speedometer Corporation gives the garage man's liability as follows:

"The liability of a garage keeper for hire is not affected by reason of the knowledge of the owner as to the place

where the property is kept. Its acceptance by the garage man imposes on him the duty of exercising due care for its safety and protection."

Generalizing somewhat, we find the following decisions covering the law of bailments which might well be applied to garage keepers:

"Where a bailment is for mutual benefit, the bailee, in the absence of a special contract, is held to the exercise of ordinary care in relation to the subject matter thereof and is responsible only for ordinary negligence."—Corpus Juris.

"It is the duty of a bailee for hire to exercise that degree of care in respect to the subject of the bailment as a prudent man in similar circumstances commonly takes of his own goods."—From a New York case.

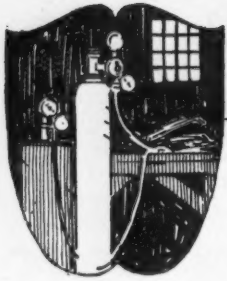
The supreme court of New York, in the case of Smith vs. Economical Garage, touches directly upon the freezing question and says:

"Proof that a motor car, when delivered to a garage keeper was in good order, but when called for a few days later it was damaged, the water-jacket having frozen and burst, makes out a prima facie case against the bailee, the garage keeper."

### CONCERNS STORAGE ONLY

Remember, this discussion concerns only storage without service, and has to do only with transactions where a car owner leaves his car in a public garage for the purpose of having some place to keep it and not expecting that it will be cleaned, oiled or groomed in any way. It seems to be the consensus of opinion that even under such a limited storage contract the garage owner is liable under the law for cracked cylinders if, as a reasonable man he would have protected the car further than he did were it his own.

This liability cannot be evaded by establishing or pleading a custom that it is contrary to a policy in the locality where the question arises for garage men to drain cars under storage contracts. To be safe, garage keepers should expressly contract with their patrons that they will not drain cars in cold weather unless ordered and paid to do so.



# Autogenous Welding

## *What it is and how it is applied*



### *What Welding Means to the Automotive Service Man*

THIS is the twenty-second of a series of articles on autogenous welding. These articles are intended to be of aid to the man who must learn the art of welding with little or no personal instruction. They are also intended as a reference for the man attending a welding school. It is likely that during the first few months of his instruction many problems will come up that may be solved more readily with these articles on hand.

Finally, this service should be of benefit to any automotive service man or repairman, even though he never intends to have a welding torch in the

shop. The reading of these articles will give him an understanding of the subject which should greatly aid him in general repair work. He will be better able to decide, when he has a part to repair, whether it is feasible or not to weld it, and if so, if it will pay. The more familiar one becomes with this art, the wider the scope of its application. The man who is versed in the art will find many clever applications that one who is less familiar with the subject would never dream of. An understanding of welding principles offers a new technique to the repair man.

## Part XXII—Welding Copper

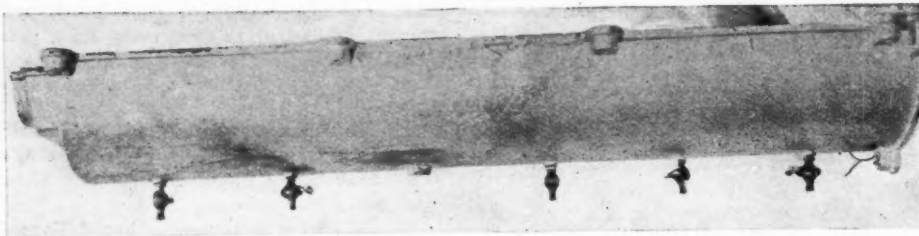


Fig. 90—The aluminum oil pan shown above had a large piece broken out of its side. Such a casting should be laid over a small charcoal fire so that the full section, about the length of the break, will be uniformly heated, the broken piece included, since it should be heated along with the rest of the casting. When the metal has reached the proper temperature the welding should proceed. The piece should first be tacked in place or should be held in place with the assistance of a welding rod which has been fused to the piece

COPPER usually is produced in a pure homogeneous form. Impurities are present only in small amounts and are not materially affected by fusion. It is a good conductor of heat, tough, ductile and malleable.

It would appear, therefore, that it is an easy metal to weld. Such is not the case, however, for two reasons: It absorbs gases very readily, particularly carbon monoxide and hydrogen. These are the gases which issue from the inner cone, and which combine with the oxygen of the air to form the non-luminous envelope. When copper is molten it dissolves these gases just as water will dissolve air. When the metal begins to solidify again these gases are released and form blowholes and pinholes and in this way weaken the structure.

In the second place, copper is difficult to weld because it oxidizes very rapidly

when undergoing fusion, and unfortunately the molten metal has the property of dissolving the oxide to such an extent that the metal may be seriously weakened.

In addition, the tensile strength decreases rapidly as the temperature is raised, especially from 500 deg. upwards until at 900 deg. the tensile strength is only 40 per cent of what it is at atmospheric temperatures. Because of this weakening under heat the strains resulting from construction in the weld during cooling must be carefully dissipated or the weld or the metal adjacent to it may fail.

A neutral flame should always be applied in welding this metal. If an excess of acetylene is used the products of combustion are richer in carbon monoxide and hydrogen, which are readily absorbed. If an oxidizing flame is

used the weld becomes saturated with oxide.

A larger sized blowpipe head than the melting point of copper indicates is used because of its high thermal conductivity. Where possible, auxiliary heating such as air-gas flames or charcoal fires should be employed. This will greatly aid in welding as well as in torch consumption.

The tip of the blowpipe should be vertical during welding. Molten copper is quite fluid and would be blown ahead if the blowpipe were inclined. The vertical position of the blowpipe gives complete protection against the oxidizing effect of the air since the envelope flame completely covers the molten mass.

A correctly formulated welding rod is of supreme importance. Such a rod will overcome to a great extent both the absorption of gases and the solution of the oxide. It is not possible to remove the oxide in the weld by means of a flux because it is actually dissolved in the metal. It is necessary to incorporate some chemical in the rod which will actually take the oxygen away from the copper oxide, in other words, a deoxidizing or reducing agent. Such a chemical has a greater affinity for oxygen than copper has. Also as an oxide it should be lighter than molten copper so that it will float on the surface. Thus it acts as a protective coating and prevents the absorption of gases to a certain extent.

Phosphorus is a very satisfactory reducing agent. There should not be more than one per cent in the welding rod or the metal will be pasty and the weld weakened.

After welding the grain of the weld and



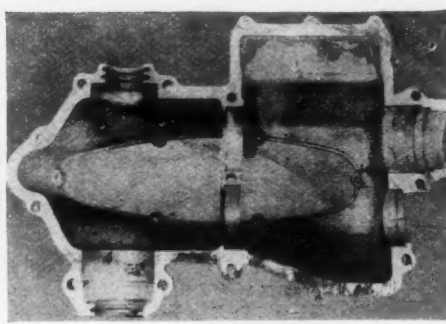
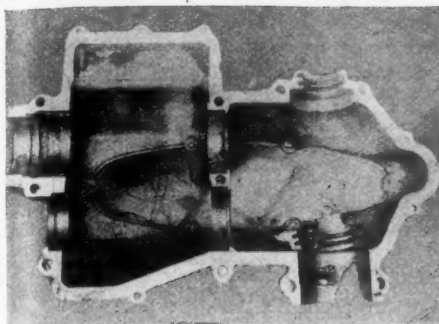


Fig. 91—These two photographs illustrate the repair of a chain drive transmission. It is an aluminum casting and it has broken in one of the jack-shaft bearing houses. Inasmuch as the bearing house is quite free to expand, extensive pre-heating is not necessary; it is sufficient to warm the section enclosed by the double rim with the blow torch. The broken pieces may then be put in place and welded, or if there is difficulty in their staying put it might be advisable to tack them in place before pre-heating. The second photograph shows the job completed

the metal adjacent can be improved by hammering at a low heat. Or still better, the entire weld should be annealed at 900 deg. and quenched in water.

Since copper is a good conductor of heat it absorbs the heat from the blow-torch with great rapidity. Consequently when pieces of  $\frac{1}{4}$  in. in thickness and larger are to be welded a size larger welding head should be employed than is required for steel of the same thickness.

Copper flows very easily when melted and therefore care should be taken that it is not forced ahead onto cold metal. Copper also oxidizes very rapidly when melted. A special filling rod is used to prevent this. If a satisfactory filling rod is employed it is not necessary to use a flux.

An edge weld is carried on in the same manner as for steel but a flux is used. The jet of the flame should never be allowed to touch the metal but should be held about  $\frac{1}{8}$  to  $\frac{3}{16}$  of an inch from it in a vertical position.

A butt weld is done in the same fashion as steel or aluminum. Care should be taken that the joint is melted out so that the bottom edges are fused thoroughly together. The welding rod is added regularly and if necessary the flux is applied with it.

A joint with beveled edges is done in the same way as other metals. The filling rod should be the same size as for steel of that thickness.

The strength of copper welds on heavy sections can be improved by hammering cold—never hot. After hammering, further improvement is obtained by heating to a red hot heat and plunging in water.

#### BRAZING MALLEABLE IRON

Malleable iron cannot be welded satisfactorily and, therefore, should be brazed at a bright red heat using Tobin or manganese bronze as a filling material in connection with a brazing flux. The difficulty in welding malleable iron lies in the fact that its surface is soft and has a composition somewhat similar to mild steel while the interior is grey cast iron.

The plates to be joined should be bev-

eled to 60 degrees, although where it is possible to apply a reinforcing joint it is not always necessary to V out.

Bring the pieces to be welded to a cherry-red heat by means of the welding blowpipe. If the casting is large this preheating may be aided by a light gas torch.

Use a  $\frac{1}{4}$  or  $\frac{3}{16}$  in. tobin or manganese bronze welding rod. Heat it and dip it into the flux. Then melt the fluxed rod into the V as fast as possible.

Fill up the V for a short section until there is  $\frac{1}{8}$  in. excess metal and then proceed to the next section and so on.

When the brazing is finished the work should be covered with asbestos and allowed to cool slowly.

The edges of the malleable casting should not be heated hotter than cherry red; never to a melting heat.

Be sure that enough flux is added to keep the edges of the casting clean.

In welding brass and bronze a suitable welding rod and flux should be used.



burning out of the brass. It is not possible to prevent these fumes entirely but they can be reduced by the use of a proper rod and flux.

Keep the point of the cone slightly away from the weld so that the heat will volatilize the zinc or tin in the brass or bronze.

#### COPPER TO STEEL

To join copper and steel first bring the steel to a white heat and then place the copper into contact with it and the two metals will fuse together making a perfect weld. When the copper commences to flow withdraw the flame slightly in order to prevent the burning of the copper.

#### HIGH SPEED STEEL

To weld high speed steel to ordinary machine steel the end of the piece to be welded must first be heavily coated with soft iron. This can best be accomplished by preheating the piece uniformly as hot as is safe before welding. After being cooled it can then be welded to an ordinary piece of machine steel without burning.

#### CAST IRON TO STEEL

To weld cast iron to steel, cast iron rods must be used as a welding material. The steel must be heated to the melting point first as cast iron melts at a lower temperature. A small amount of scaling powder should be used.

#### JORDAN PRODUCING 90 DAILY

Cleveland, Dec. 11—Announcement has been made that the Jordan Motor Car Co., has started on a 90 day production program. It is an increase in the number of cars per day over the record of the last few months, but is under the program of a year ago. E. S. Jordan, president of the company, speaks optimistically about future prospects, asserting that so long as men and food and

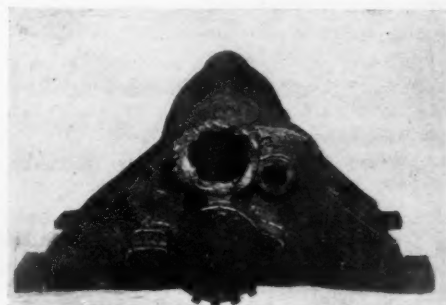
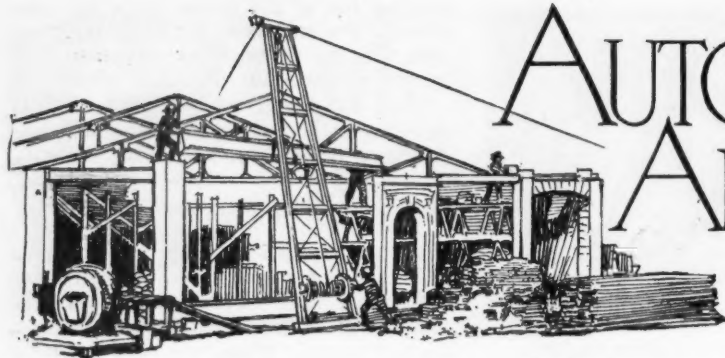


Fig. 92—The aluminum gear case shown at left has broken in the rear bearing of the main shaft. This gear case is not upside down. The broken pieces should be tacked in place while cold and then the casting should be heated in a charcoal fire until it is warm enough for the welding to proceed. After the job is finished some machining will be necessary, as is indicated by the appearance of the second photograph

The same sized welding head as for steel should be used.

When the metal is melted it will give off fumes which are poisonous and should not be inhaled. The fumes are zinc oxide and are produced by the zinc

finished products must be moved there will be a demand for cars. He said that he was confident there would be a shortage of cars next spring on account of the slow down in production after the Ford announcement of price reductions.



# AUTOMOTIVE ARCHITECTURE

Planning and Building Problems

CONDUCTED BY TOM WILDER

## Layout for the Ford Service Department

It would help us a great deal if you would suggest a layout for our shop equipment. We have arranged a workshop with part wood floor and part cement floor. This we think is desirable in that the machinery is handled easier on a wood floor and, furthermore, a wood floor will be warmer to work on.

It is our idea to use but one small stationary bench. The other benches are to be on casters. Our present lineup on machinery includes: 15 hp. motor, Nazett combination burning-in machine Model "F", 20 in. drill press, Greenerd arbor press, Fairbanks C S straightening press, Fairbanks 3-way torch, Storm Ford rebabbiting jig, Storm Fordson rebabbiting jig, Storm reborer tool for drill press, Fairbanks coil testing machine, small Tungar rectifier, complete set of small tools, taps, dies, etc. We will have to purchase a small forge, good tank and heater, overhead track and hoist, and an electrical testing outfit.

We will not install a lathe at this time for the reason that we get our lathe work done locally. We may buy a small bench lathe for armature work, and perhaps a good welding outfit of the portable type. Other equipment will be added as needed. —King Motor Co., Lake Mills, Ia.

The first suggestion we should make, unless it is too late, is that you make the partition "A" of folding doors. This will enable you to take a car in or out of the shop without disturbing all the others. After that it would be as well to close up the doorway "B" or change it into a window.

We do not see how you can use movable benches to very good advantage as you will have little space to move them in. Some of the small "Tea-Cart" benches would be good for engine and

axle work, but for regular work there is nothing to take the place of a good solid well anchored bench.

Until you purchase your lathe, which perhaps you will never do, the engine and axle bench we show might be located in the lathe position at the other side of the axle and engine stands.

Another recommendation which we have made very often, and which would be specially good in your case, would be the installation of individual motor drive on all your power driven machines. It will cost a little more to do this, not much, but the ease of making new arrangements as conditions change or

### No. 295

#### STORAGE AND REPAIR SHOP

We would like your assistance in planning an arrangement for a storage and repair shop. We do not intend to have a salesroom, as we are not going to handle cars or trucks at present.

The first floor is to be used for storage, washing, greasing, tire work and quick repair only.

At present we are doing all our work on the first floor, but want to use a second floor in the spring. Therefore, we want your advise as to means of getting to second floor and method of arranging shop, etc.

The second floor is only on the south end except the strip 20 by 81 down center of building with windows on both sides.

It is planned to locate elevator at "X" with bench along Cherokee Street and machinery in this just 20 by 81. We want a fully equipped shop to do all kinds of

#### Automotive Architecture

IN this department MOTOR AGE aims to assist its readers in their problems of planning, building and equipping service stations, garages, dealers' establishments, shops, filling stations, and in fact any buildings necessary to automotive activity.

When making requests for assistance please see that we have all the data necessary to an intelligent handling of the job. Among other things we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor. Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

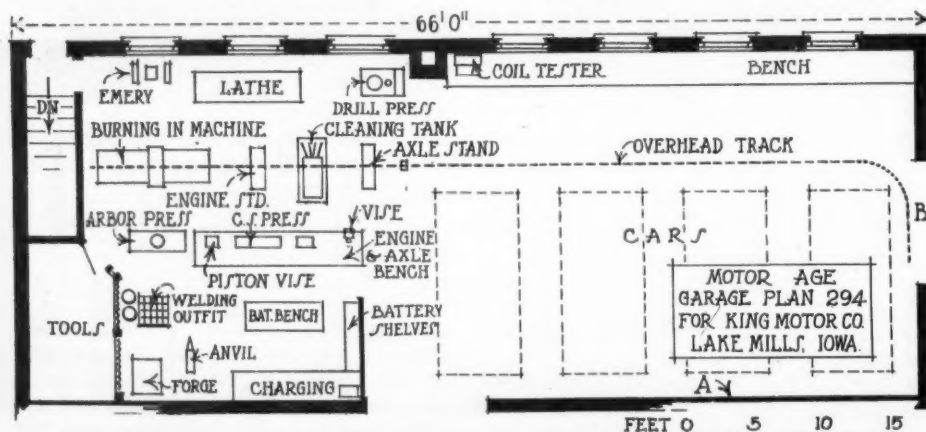
work except painting and top work.

Where should the service salesman's office be located? Also indicate location of tire repair department.—Stock Yards Garage, St. Joseph, Mo.

Your idea of moving your shop to the second floor is a step in the right direction. It is much better to keep all the repair work segregated from the storage, so that customers will not be able to go through the shop and give men instructions.

The service salesman's office should be placed near the entrance, so that when a customer drives in for service, he won't have to repeat his orders to everyone in the place before he reaches the right man. He should be able to meet the manager or his assistant trouble shooter at once upon entering; the trouble should be diagnosed and an estimate made at once. If it is a simple adjustment for the quick service room, it can perhaps be done immediately, otherwise the car is sent to the second floor and the owner told when he can call for it.

The corner seems to us to have all the advantages of location for an accessory store, and general office. It is space that cannot be used to advantage for storage, but is very valuable for the display of goods. By arranging it somewhat as we show, the accessories can be shown to those who enter as



No. 294—Layout for Ford service department



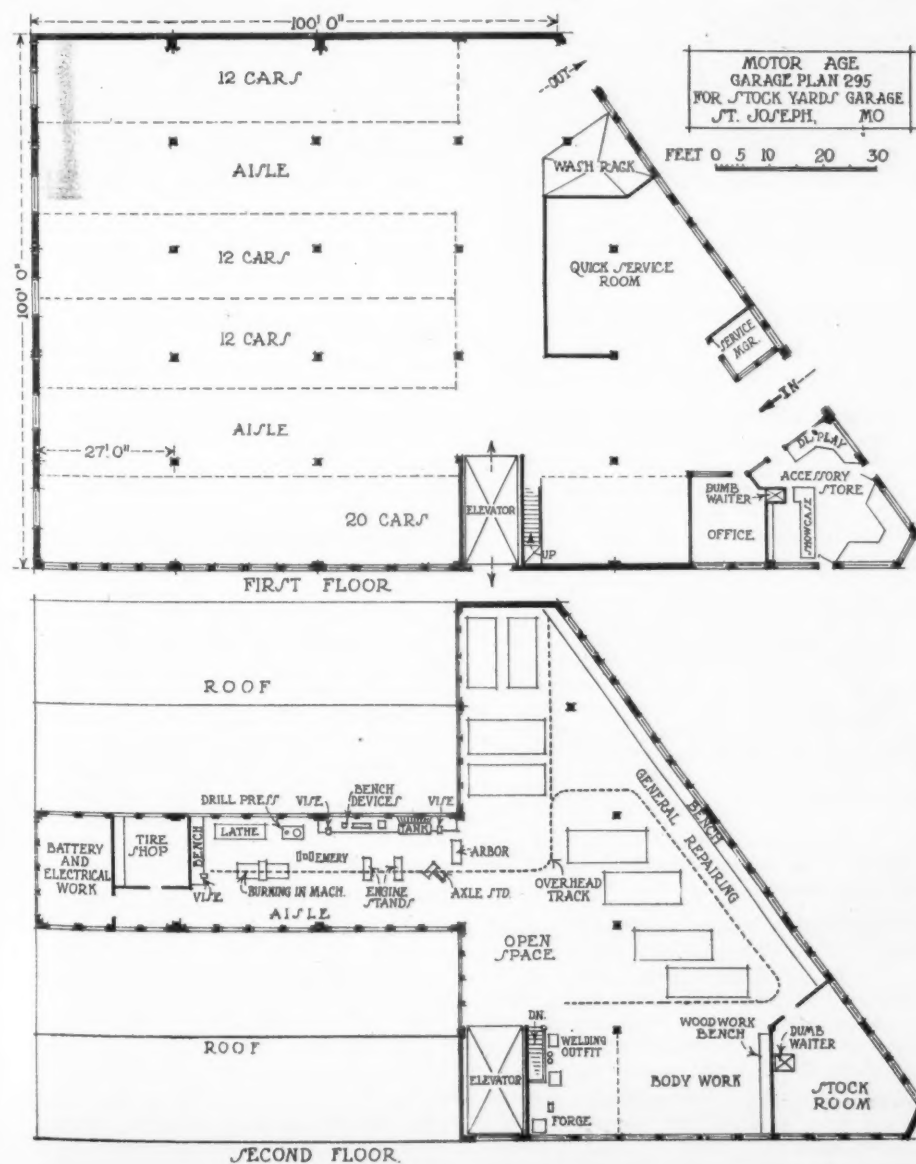


### Leave No Doubt as to What You Have to Sell

NEARLY \$10,000 which could otherwise have been saved was spent in effecting the touch of the unusual in the architectural design of the front of the establishment of the Laher Auto Springs Co. of Seattle. It was, however, considered good business to make the front of this

building of such a design that it would not fail to attract the attention of all who passed, and in addition, emphasize the line specialized in—automobile springs. This concern is not content, however, with the advertising afforded by this means, but makes liberal use of the

printed word in advertising as well, which is believed to be absolutely essential, especially when business is slow. Not every concern can spend as much as \$10,000 for an unusual appearing front, but every prospective builder should take into consideration the permanent advertising asset of a building that typifies the line specialized in and demands attention of all who pass—even at a distance.



No. 295—Storage and repair shop

well as to those who pass on either street. It has been demonstrated many times, that accessories could be sold to people who never had any idea of buying simply by displaying them at a certain place where the people had to stand and look at them. You have just such a certain place here. While a man is waiting for his estimate or adjustment, keep an attractive seasonable accessory display "staring him in the face," and he is almost sure to fall for something or see something that he will come and get later.

#### OWNERS OPEN SERVICE STATION

Columbus, Ohio, Dec. 10—The Automobile Owners' Service Co., recently organized with Ralph Van Cloud as president and general manager, has opened its service station here. The plan of organization calls for a fleet of motorcycles with mechanics to answer calls 24 hours every day.

#### WESTCOTT DEALER MOVES

San Francisco, Dec. 10—C. P. Kiel, wholesale distributor for Westcott cars in northern California, and The Kiel-Barnes Co., retail Westcott dealers in San Francisco, have moved into their new home at 928 Van Ness Avenue. It is a stone and concrete building housing both the sales and service departments. C. P. Kiel was one of San Francisco's first automobile dealers.

#### GRAHAM TO ADDRESS DEALERS

Detroit, Dec. 10 — Vice President George M. Graham, of the Pierce-Arrow Motor Car Co., will be the speaker at the next monthly dinner meeting of the Detroit Auto Dealers' Association to be held at the Detroit Athletic Club Dec. 20.

# The Readers' Clearing House

## Questions and Answers

### The Ford as a Racing Car

*A Description of a Speedy Home-Built Ford Racer  
and How It Was Designed*

MANY inquiries have been received concerning the rebuilding of Ford cars to make them fleetfooted and reliable contenders in dirt track races. Nothing is more valuable than a review of what has been done along this line and the presentation of the description of a rebuilt Ford that has competed successfully in dirt track races during the past year.

The number of races held and the increased size of purses offered during this and the past season has encouraged the building of numerous small racing cars. The majority of these are Fords, due to the fact that they can be built cheaply, and to the possibility that by adding some of the numerous devices, on the market now, for increasing speed and power, they can be made to show truly remarkable speed, and when properly built can successfully compete with cars entirely out of their class as to cost.

Regardless of the initial cost, it is not an uncommon thing to find a twenty-five hundred dollar Ford at any of the dirt track events held throughout the country and the speed obtained from many of them has surprised even people familiar with racing engines. Practically every means of obtaining speed and power and in every way pepping up the engine has been tried.

There are engines using eight larger valves placed in the ordinary position which have in the past been considered a real improvement. There are engines using special cylinder head with eight overhead valves, which are now being used and have proven real contenders with other cars built for dirt track work. Then there are cars built using the 16-valve head and it is this type of equipment with which the car described is equipped.

The chassis was designed specially for half mile dirt track work, having a wheelbase of only 72 in. The tread was narrowed to 44 in. The frame was bent to the desired shape as shown in the illustration. The front axle was dropped 6 in. and spring seats welded to it. The springs were made specially for the job and were so designed that they had only  $\frac{1}{2}$  in. camber in them with the car loaded, allowing the top of the frame to be level with the center of the axles. The steering gear is a small worm type

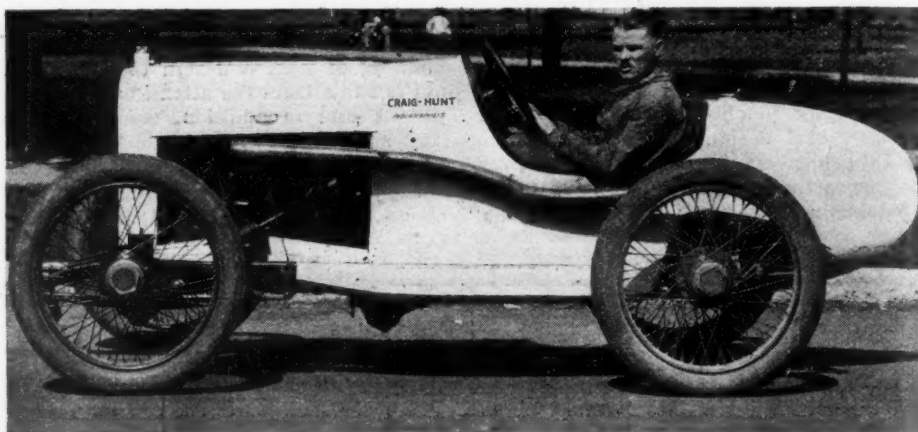


Fig. 1—Ford racing car built by Bill Hunt of the Speedway Engineering Corp. of Indianapolis. This car attained a speed of 85 miles an hour and won eleven firsts out of fourteen starts

CONDUCTED BY ROY E. BERG

*Technical Editor, Motor Age.*

#### THE READERS' CLEARING HOUSE

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by some one else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

for which it is necessary to make a special third arm and drag link which fits the Ford spindle body.

The engine which develops 52 hp. is equipped with aluminum pistons, each of which is fitted with two Chopal piston rings. The rods are made from stock Ford forgings. These were machined to remove all surplus weight and the bearing caps fitted with special oil dips to supply additional lubrication. An oil pump was installed on the side of the engine, operated from number 4 intake cam, from which leads are run to each

main bearing so that at all times oil is being fed at pressure to the main bearings and a constant oil level, higher than that of the stock Ford, is maintained at all times. The engine is equipped with a Craig-Hunt 16-valve racing head. This head is the new type with the bevel gear driven camshaft. A centrifugal water pump is driven by miter gears from the vertical shaft which drives the camshaft.

Ignition is obtained from the regular Eiseman Ford outfit and as the cylinder head is equipped with two sets of spark plugs, double ignition was obtained by the use of Su-Dig Series spark plugs connected in series with the other set of standard plugs. Two carburetors were used each on a separate manifold; one for the front two cylinders and one for the two at the rear. It has been found that while the maximum speed was not greatly increased by this the acceleration was much faster and this arrangement proved to be of great advantage for half mile track work. The outside exhaust pipe was made of 2 $\frac{1}{2}$  in. steel tubing with a flange for fastening to the motor.

The radiator is made with an En-Arco feather-weight aeroplane core which holds but one gallon of water. Another gallon is held in the tanks at the top and bottom of the radiator. Although the core is rather delicate, it is very efficient. The body was designed and built



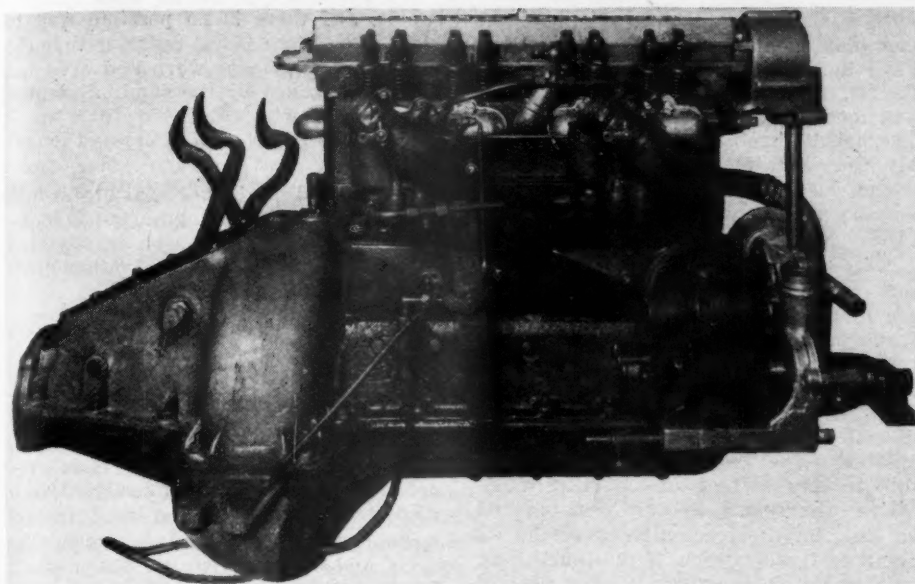


Fig. 2—Engine used in Mr. Hunt's speedy Ford. It develops 52 h.p. and uses aluminum pistons and the Craig-Hunt 16-valve cylinder head

by Craig-Hunt and is very light. The gas tank, which has a capacity of nine gallons, is in the tail. A four-gallon oil tank is hung beneath the floor boards.

Due to the high location of the carbureters it is necessary to carry pressure from about two pounds on the gasoline tank. There is an oil lead which runs from the oil tank through a double check hand oil pump and thence to the front of the motor, through which fresh cool oil is supplied when needed.

The driver sits low enough in the body so that the flare in the cowl directs the air and a certain amount of dust up and over his head. The cowl is heavily

ribbed and braced so that it will stand up in case of a turnover and offers very good protection when going through fences. The weight of the car complete is eleven hundred and ninety pounds.

This car in tests made the mile straight away in forty-one and two fifths seconds with three to one gears. It had turned three different half mile tracks in thirty-two seconds using four to one gears. Out of fourteen starts it won eleven first places and one second after a smash-up. The other two races it failed to finish. Once on account of a broken axle shaft and once because of a magneto failure.

little difficult for us to tell you just where to look for the loss in compression.

Check up on the following and see if you find things as they should be:

**Valves**—If you are sure the timing is correct and the tappets adjusted, the valves themselves may not be seating properly. In other words, the valves must be ground in to insure tightness. Have someone turn over the engine by hand slowly and if you hear a hissing sound in the carbureter air intake it may indicate a leaky valve. If the valve stems and guides are worn considerably too much air will be sucked into the combustion chambers and the engine will not idle well. Reaming out the guides and fitting valves with oversize stems will remedy this.

**Pistons and cylinders**—Faulty compression may be due to loose fitting pistons and rings. To check this have someone crank the engine slowly as before and place your ear over the breather pipe. If a hissing noise is heard it indicates the air going by the pistons and rings into the crankcase. New pistons and rings is the remedy.

**Plugs**—Leaky spark plugs will cause poor compression. Squirt a little oil around each plug and see if bubbles arise when the engine is running. The plugs may need new gaskets or they fit too loosely into the cylinder head. Sometimes graphite smeared on the threads of the plugs will overcome leaks.

We do not think that your carbureter is at fault. The fact that your engine will not run unless you close the carbureter air intake indicates that the mixture is too lean, probably as a result of an air leak as mentioned above. You

## ENGINES

### COMPRESSION ON OLDSMOBILE

Q—A 1917 Model 37 Oldsmobile has a block which has been broken and cracked by connecting rod, with engine disassembled. After assembling the engine it will not take gas unless by closing the air intake entirely for a few moments, and when running the car cannot be throttled down to less than 15 miles an hour. When speed becomes less it won't lift the gas. It runs at a speed from 15 to 30 miles an hour. The timing seems all right, the tappets are adjusted and there is no leak in the manifold. The car is equipped with a Johnson carbureter. Is the carbureter at fault? Compression is not very good. Give adjustment of carbureter used on this model.—A. O. Morken, Preeceville, Sask., Canada.

1—As long as the compression of your engine is not very good we should be inclined to think that there's where you must look for your trouble. The successful operation of an internal combustion engine is dependent upon compression to a large extent, in fact, if you had no compression the engine would cease operating altogether. We do not know how good a job you did when the engine was re-assembled, consequently it is a

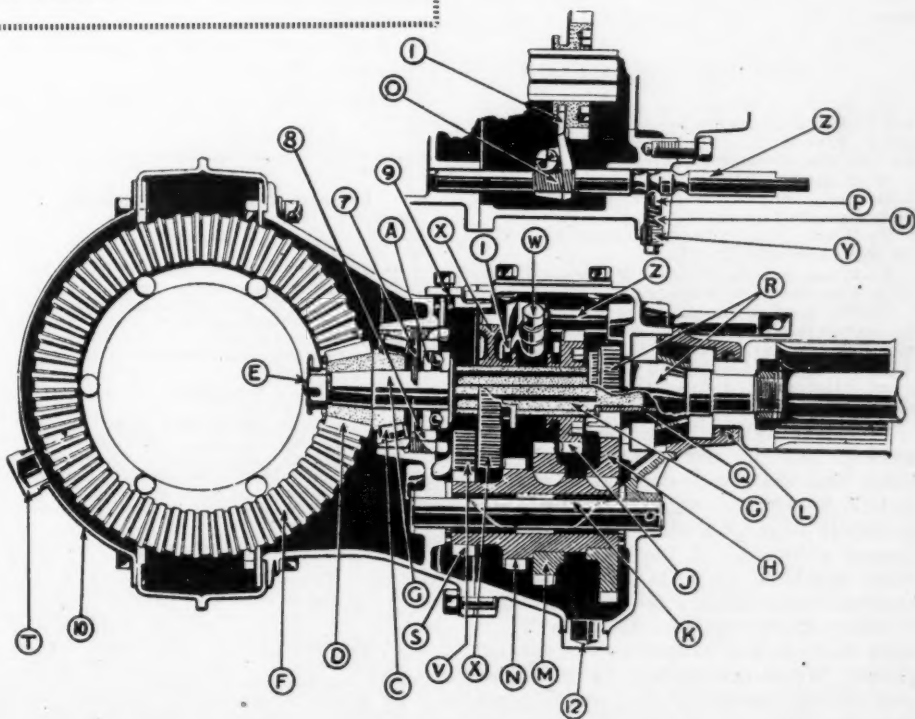


Fig. 3—Cross section of 1917 Briscoe transmission

also would probably get better results if you had some sort of hot-spot device between your carbureter and manifold, as the present day fuel requires an abundance of heat to properly vaporize it.

If you think your carbureter is out of adjustment proceed as follows:

First—Before starting the engine turn both the low speed screw and the spray needle to their seats. Next open the spray needle on the bottom of the carbureter one and one-half turns. With the adjustment in this position the engine can be started.

Second—When the engine is warmed up sufficiently to place the spark lever in a fully retarded position, open the throttle quickly and if the engine does not backfire it indicates that the mixture is too rich and the needle should be closed by turning it to the right about one-eighth of a turn. Open the throttle quickly again and repeat this operation until the engine backfires which will indicate too lean a mixture. Open the needle slightly by turning it to the left which will correct the mixture.

Third—Adjust the throttle stop screw until the desired idling speed is secured.

Fourth—If the engine does not fire smoothly the low speed mixture is too rich and must be corrected by backing out the low speed screw on the side of the mixing chamber which will admit sufficient air to make the firing smooth and even. Then lock it in position with the lock-nut. If the engine has increased in speed from this adjustment restore the idling speed by unscrewing slightly the throttle stop screw and if necessary reset the low speed screws, both of which must be adjusted in combination.

Be particular to leave the choke on the side of the carbureter in a wide open position and in making adjustments see that the choker button on the instrument board is all the way in.

### DETECTING KNOCK

Q—What is the knock characteristic to all Buick engines and its cause and remedy? Would removing the babbitt flanges on the No. 3 main bearing and replacing it with a close fitting fiber washer on each side, help any to remove the end play permanently?

2—What causes the bearings to loosen in the caps and knock?

3—What causes the center main bearing in a Chevrolet to burn out?

4—There is a compound on the market to lap in bearings in an engine. Is this method of bearing fitting successful?

5—Do you recommend fitting a one-piece ring such as the Inland to a new engine?—C. R. Kimble, Norwalk, Calif.

1—This question is rather difficult to answer. In the first place we do not know that the Buick car has a characteristic knock. All engines have a characteristic sound but this can hardly be termed a knock. If the engine knocks there must be a cause. In cases we know of, the popping noise that developed in many Buick engines, particularly the older models, was caused by the exhaust valves. We do not see why excessive end play should develop if the bearings are properly fitted.

If the Buick engineers had considered

fiber washers necessary to eliminate the end play of the crankshaft they would have incorporated it in the design. If the No. 3 main bearing is causing trouble and loosening up it must have a cause. The babbitt itself may be at fault. Possibly the shaft is out of line or out of round. If the bearing is badly worn it may be necessary to replace the bearing caps.

2—It is possible that the babbitt is so soft that it causes trouble. However, we are inclined to believe that the shaft is sprung or out of round. We advise the removal of the shaft and an accurate check made.

3—This question is so lacking in detail that it is impossible to give a definite answer. The most logical reason for this trouble is lack of sufficient lubrication which may be due to a plugged oil line, improper functioning of the oil pump or the condition of the lubricating oil. At the present time a great deal of trouble is experienced because of the dilution of the lubricating oil. If the oil has not been changed for a long time and it is in a very badly diluted condition, and besides has absorbed a great deal of dirt, it is possible that this condition has something to do with the burned out bearing.

4—There are several compounds on the market for lapping in main bearings. We do not believe that it is advisable to resort to this practice. There is always a possibility that a compound of this kind may contain an ingredient that cannot be removed from the babbitt and, consequently, it will result in a lot of trouble. We had occasion to make an analysis of one of these compounds. The claims made for it were that it would permit the fitting of bearings in a short time and that it was unnecessary to remove the compound because it lost its cutting power. Analysis shows that this compound contains sand and it is certain that there is not present in this compound any other ingredient that will dissolve sand.

Furthermore, sand will work into the

babbitt and there is no possible way to get it out. The natural result is that the babbitt soon becomes worn and even the shaft is attacked by the sand. Scraping the bearing will require a little more time but it will insure a better and longer lasting fit.

5—It should not be necessary to fit new piston rings in a new engine, but if found necessary we see no reason why a ring of this kind will not prove satisfactory.

### GEAR SHIFTING TROUBLES

Q—What is the trouble with a 1917 model Briscoe when gear reverses well but can not be put in second at all and won't stay in high unless it is held?—W. Y. Allen, Athens, Ga.

In this model car the transmission is located at the front of the rear axle. Refer to Fig. 3 which is a sectional view of the transmission. When the gears are in neutral, the countershaft gears spin freely and do not drive the pinion shaft G which connects with the rear axle. When the gears are in high this is also true, but the sliding gear J is moved forward into such a position that it fits over the constant mesh gear R and is driven by it.

When the gears are in second this sliding gear J is pushed back into mesh with gear M on the countershaft. The sliding gears X and J are operated through the gear shifting rod Z, and a corresponding rod on the right hand side of the car. The left hand rod operates sliding gear X which it moves into the low speed and reverse positions, and the right hand rod operates sliding gear J which it moves into the second and high speed positions.

These gear shifting rods are held in the proper position by the action of plungers P which fit into three grooves properly spaced on the rods. If there is not sufficient tension on the spring behind the plunger P the gears may have a tendency to slip out of mesh, and if there is too much tension on the spring they will not shift easily. The lack of proper tension is undoubtedly causing your trouble. The tension can be regulated as necessary by removing the plug Y which holds the spring.

To decrease the tension cut off part of the spring and to increase the tension place a washer between the spring and the plug. The shifting gears are operated through a yoke 1, which is fastened to the shifting rod through a screw adjustment O. The purpose of this adjustment is to make sure that the sliding gears are in the proper position when the shifting rod is in its corresponding notch.

In your case, poor adjustment may have a great deal to do with the fact that it is impossible to shift into second. The sliding gears X and J should mesh fully with the countershaft gears when they are in driving position and have sufficient clearance between them when they are in neutral. This clearance may be adjusted by loosening clamping screw W, disconnecting the pull rod which leads to the control lever, and screwing the gear shifting rod in or out of the shifting yoke. Turning in a right-hand direction moves the sliding gears toward the front end of the car and vice versa.

### Where You Will Find the Answer

TO assist readers in obtaining as a unit all information on a certain subject, MOTOR AGE segregates inquiries in this department into divisions of allied nature. Questions pertaining to engines are answered under that head and so on.

#### Engines

A. O. Morken.....Preeceville, Sask., Canada  
C. R. Kimble.....Norfolk, Calif.  
W. Y. Allen.....Athens, Ga.  
Aaron Settle.....145 N. Homan Blvd., Chicago  
J. W. Redick.....Fountain, N. C.  
Clarence S. Sofield.....New York

#### Miscellaneous

Walter Burns Marshall.....Norwood, R. I.  
E. B. Ingram.....Eau Claire, Wis.  
Henry Sazin.....New York  
W. J. I.....St. Paris, Ohio  
W. D. Thorpe.....Stillwater, Okla.  
R. J. Reiter.....Minneapolis  
Wm. Sticht.....Jersey City, N. J.  
De Davis.....Decatur, Ill.  
Reader.....Green Bay, Wis.



### THE GASOLINE ENGINE

Q—What are three requirements of a good fuel? State one fuel for each requirement that excels others in that respect.

2—Trace the application of power from the power stroke piston to the rear wheel. Name 10 important parts on the way back from piston to rear wheel.

3—Diagram a crank shaft for a 4-cylinder motor. Select firing order and explain your selection.

4—State four mechanical means by which combustion in a cylinder is accelerated.—Aaron Settle, 145 N. Homan Blvd., Chicago.

1—The first and probably the most important requirement of a good fuel is its heat contents. The gasoline engine is primarily a heat engine and therefore it is essential that the fuel have great heat value. The second requirement is that the fuel be volatile or, in other words, have a low point of vaporization. The third requirement is that the fuel should have the first two properties and when used should not produce the fuel knock, or detonation, that is causing so much trouble at the present time.

The lower grade fuels contain the greatest number of heat units but, of course, it is not possible to use the extremely low grade fuels in the automotive engine with the present methods of handling the fuel. The fuel that is giving the best results and that comes the nearest to meeting the first two requirements is gasoline. Either is a very volatile fuel but it produces a very bad detonation. Kerosene contains a greater number of heat units than gasoline but with the present method of handling in many cases gives detonation.

The fuel problem is being studied very carefully by the foremost engineers and they are endeavoring to either change the fuel or the method of handling it so as to eliminate the detonation. It has been found that the introduction of iodine or anoline in gasoline will eliminate the knock. One engineer is working on combustion chamber design and spark plug location in hopes of eliminating the knock through the change in design.

2—When the piston travels downward on the power stroke the crankshaft revolves. This rotary motion travels through the clutch to the transmission, front universal joint, drive shaft, rear universal joint, pinion gear, ring gear, differential, thence to the axle shafts.

3—The crankshaft selected is shown in Fig. 5. Let us assume that No. 1 piston is coming down on the power stroke, and No. 2 is coming up on the exhaust stroke, then No. 3 is coming up on compression and will fire next. This being the case the firing order will be 1, 3, 4, 2.

If No. 1 piston is going down on power stroke, No. 2 must be coming up on either compression or exhaust. If on compression it would of course fire next and this being the case the firing order will be 1, 2, 4, 3.

4—The question stated is rather confusing and, therefore, we shall assume that you mean the four mechanical means by which the gases are accelerated. The gas is drawn into the combustion chamber through the intake valves due to the partial vacuum or suction of the pistons. The valves then close and

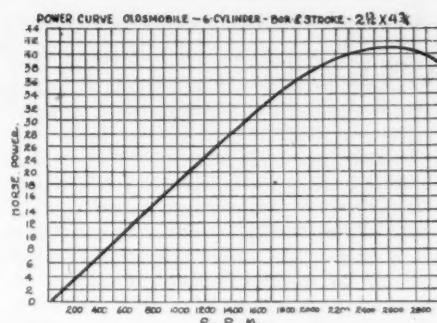


Fig. 4—Power curve of Oldsmobile

the gas is compressed by the upward travel of the piston. Ignition then occurs and the force of the rapidly expanding gas forces the piston down on its power stroke. The exhaust valve then opens and the burnt gas is driven into the exhaust pipe.

### STRANGE KNOCK

Q—What causes a light knock in an Overland 90? The valves have been ground and adjusted, bearings tightened and new timing gears installed.—J. W. Redick, Fountain, N. C.

Are you sure that all is as you say it is? If so then there are but a few possibilities left which might produce the knock. Does an examination of the camshaft bearings disclose any looseness? Very often a camshaft bearing of the tubular type will allow a slight knock. This occurs at one-half crankshaft speed which is a means of identifying the trouble. A tappet noise which is one that will not be corrected by an adjustment of the valves may also be the trouble. This may be determined by prying each tappet sideways to see if there exists any looseness due to wear. If so a new tappet and guide will correct this trouble. The trouble might be in the generator in which case the knock will occur

faster than crankshaft speed by almost two times.

A knock which seems to be as elusive as this one does, must be traced down by a process of elimination. Start first and determine the speed of the knock. Does it occur at crankshaft speed or at one-half crankshaft speed? Determination of this at once places the knock in either of two classes, those noises produced by the crankshaft and its attendant parts or the valve gear and its parts.

Once this is done the exact source of the trouble is much easier to find.

### VALVE SIZES

Q—Give advantages and disadvantages of an engine with larger intake valves than exhaust valves which we find in all Buick cars; also what advantages or claims the Buick company have for this construction.—Clarence S. Soffeld, New York.

One of the biggest factors controlling the performance of an engine is the size of the intake valve. In the Buick engine, for instance, the engineers have chosen the size of intake valve necessary to give certain results. The exhaust valve is sufficiently large to allow the exhaust gases to pass out quickly but is considerably smaller than the intake valve. It is very probable that the exhaust valve is smaller than the intake because there is not room enough for two valves the same size as the intake valve. So far as we know the Buick company is not making any particular claims for this type of valve construction.

### OLDSMOBILE POWER CURVE

Q—Publish the power curve of the 1921 Oldsmobile engine.

The power curve of the engine used in the 1920 models is shown in Fig. 4. So far as we know the 1921 engine power curve will be the same as the 1920:

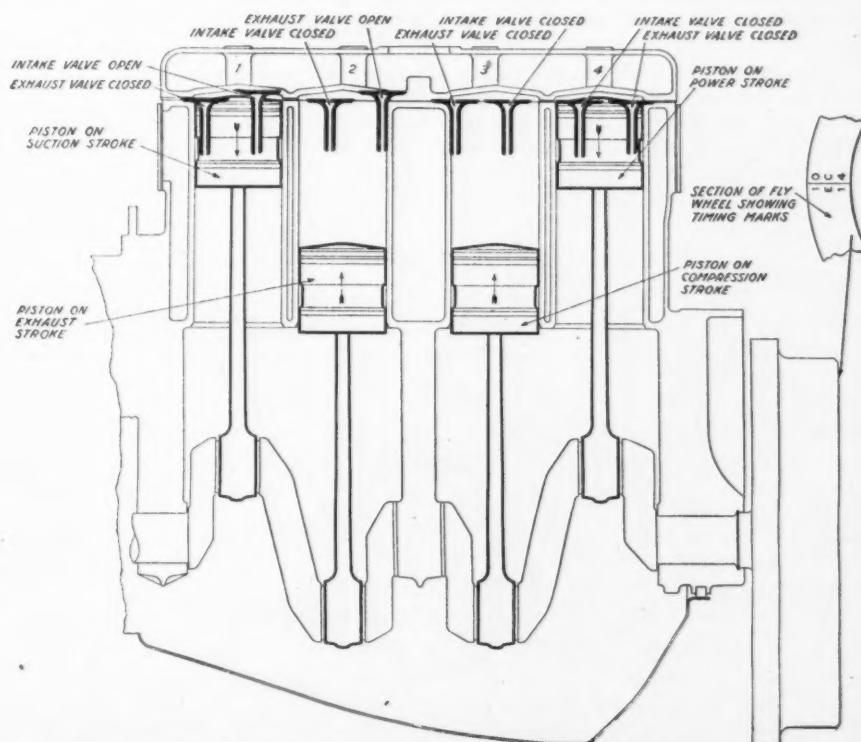


Fig. 5—Diagram of four-cylinder engine showing firing order

## MISCELLANEOUS

### SLIPS OUT OF GEAR

In the November 4 issue of *MOTOR AGE* we published a diagram of the transmission and clutch used on the 1916 Chandler. The units used in 1917 are slightly different. A cross sectional view of the clutch and transmission is shown in Fig. 8. To eliminate the trouble of slipping out of high gear we suggest the following remedy: Remove the floor boards and place the shifting lever in neutral position. Measure the distance between the rear end of the high speed shifting rod and the rear end of the shifting lever housing. Reference to Fig. 8 will show you the exact position of the parts referred to. Mesh the third speed gear with the gear drive and clutch shaft the same as when driving and make another measurement the same as above. The travel necessary to move the third speed gear into the proper mesh should equal  $\frac{1}{2}$  in.

If it is found that after the shifting lever has been moved as above, the rod may be moved even farther by means of the pressure applied on the shifting lever, hold the lever in that position and take another measurement of the distance, the object being to determine how much additional travel may be permitted. If the shifter rod may be moved forward from that position more than  $\frac{1}{32}$  in. beyond that point it will indicate that the fork should be advanced an equal distance on the shifter rod, in order that the third speed gear may be shifted into proper mesh with the main clutch shaft gear. The shifting rod can be drilled to permit the further movement of the shifting fork forward on the shifting rod, providing the shifting rod operates as it should.

It would be well to look into the condition of the locking device to make sure that the pull rod plunger seats properly within the slot of the pull rod. Also see that the tension of the spring which holds the plunger in position is as it should be.

If the car on which you have been working has been driven a considerable distance, possibly the wear within the gears would allow for their coming out of mesh and if this is the case, the only solution that can be offered is the installation of new parts.

Possibly the high and intermediate shifting rod has been sprung to such an extent that it does not throw the high and intermediate slide gear far enough into mesh with the gear drive and clutch shaft. This point can be determined by removing the hand hole cover on the transmission and noting whether or not the shifting rod is in a perpendicular position, care being taken not to bend it to such an extent that damage will occur.

### OVERLAND 90 CLUTCH

Q—Publish a diagram of the cone clutch used in the Overland Model 90.—Walter Burns Marshall, Norwood, R. I.  
Shown in Fig. 6.

### WHITE CLUTCH ADJUSTMENT

Q—Explain why the clutch seems stiff and shifting difficult without grinding the gears very badly, on a White town car model GMT, engine No. GM467?—E. B. Ingram, Eau Claire, Wis.

It is evident that the gears are still in motion when the attempt is made to shift gears. This probably is due to poor adjustment. The clutch used is shown in Fig. 7. The clutch must be released before adjusting. Throw out clutch, remove plate C and with a screw driver inserted in the opening, turn rack B to the right or left, as the case may require until space G measures  $\frac{1}{4}$  in. Turning rack B to the right will cause the clutch to take hold sooner and increase the space G. Turning the rack B to the left will produce the opposite effect.

Should the clutch slip and the space G be correct, look for interference between the floor board and the foot lever. There should be at least  $\frac{1}{2}$  in. clearance between foot lever and floor board when the clutch is in. Adjustment can be made with the set screw at the foot lever con-

nection. Should the clutch squeak and grab when engaged, remove plug F and put  $\frac{1}{2}$  pint of engine oil in case A. Grease cups on cases D and E should be turned down frequently to insure a grease supply in these cases.

### INTERNAL VS. EXTERNAL BRAKE

Q—Why is the internal brake used as an emergency brake? Has an expanding brake more power than a contracting brake? Can a contracting brake be used as an emergency brake?—Henry Sazin, 537 E. 148th St., New York.

The fact that the emergency brake is used but little in comparison with the service brake probably accounts for its location inside the brake drum. With the service brake in constant use it would be inadvisable to locate it on the inside of the drum on account of the frequent adjustments necessary. You probably know from experience that it is pretty handy to be able to jump out of the seat of your car and in a few seconds adjust the service brakes.

An expanding brake has no more power than a contracting brake. In conventional brake design the expanding brake has less power. It is on the inside of the drum to begin with, and consequently, works on a smaller surface. If, however, you had an expanding and contracting brake with exactly the same area of contact and leverage, they both would be the same.

It is possible to use a contracting brake as an emergency brake. It only requires a different hook-up. We really do not see where you would gain anything from this procedure.

### CLEANING THE RADIATOR

Q—Publish chemical formula, to be used in cleaning lime, etc., from a clogged radiator.—W. F. Lee, St. Paris, Ohio.

There are two solutions that can be used to clean out deposits that may have formed from the use of certain waters and both solutions must be used with care. Dissolve about  $\frac{1}{2}$  a pound of lye in five gallons of water. Strain this solution and put it into the radiator. Run the engine for about 5 min. and then draw off this mixture.

Be sure that the cooling system is thoroughly flushed with clean water so that the lye solution will be entirely removed. This can be accomplished by

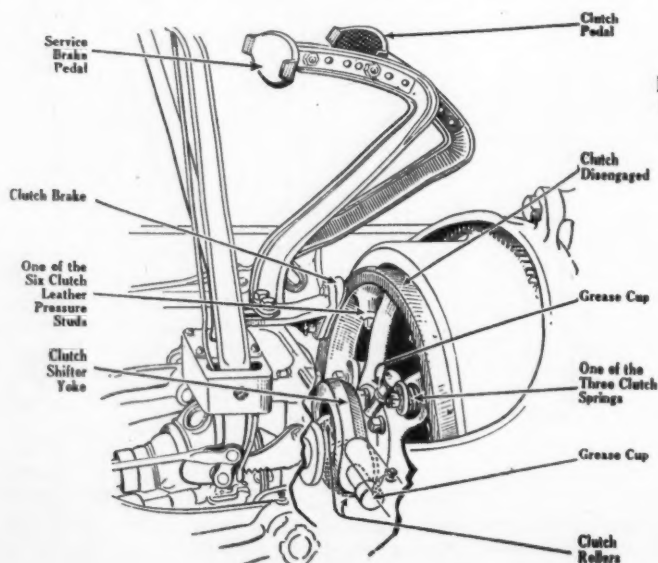


Fig. 6—Left: Overland 90 clutch

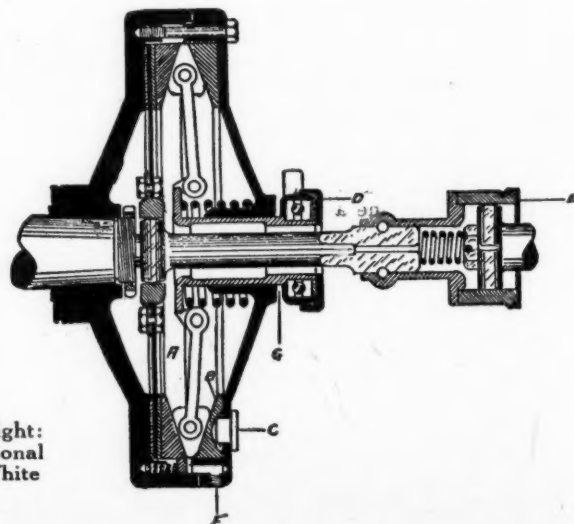


Fig. 7—Right: Cross sectional view of White clutch



filling the radiator with clean water two or three times, running the engine about five minutes after each filling and then drawing off the water. A solution of soda and water or ordinary baking soda can be used and it is necessary to follow the same directions that are given for the lye solution. When soda is used less water should be used so that the solution will have sufficient strength.

### STEERING TROUBLE

Q—What is the trouble with a 1917 Studebaker, Model 4 cylinder which steers fine on pavement but will not stay in the road when driving on country roads, above 25 miles per hour?—W. D. Thorpe, Stillwater, Okla.

It is practically impossible to give any positive information without more details of the action that is obtained. Very often a slightly bent front axle will give this action. In any event the trouble is probably due to some part being out of alignment and adjustment. Perhaps the springs have shifted. Sometimes the whole design has something to do with the way the car handles on rough roads and, of course, if this is the case it is practically impossible to make adjustments that will eliminate the trouble.

### TAKING UP END PLAY

Q—How can the end play in the drive shaft of a 1916 Stearns-Knight car be taken up?—R. J. Reiter, 511 W. 31st Street, Minneapolis, Minn.

Some of the 1916 models were equipped with only one universal joint which was located at the front. The end play in the drive shaft would no doubt be caused by worn universals. It will be necessary to examine them very carefully for wear as this would result in end play as mentioned above. The end play may be a result of worn bushings in the differential. The bushings referred to are in the differential flange, that is, the bushings in each half of the flange. When these bushings become worn it often times leads to the belief that the end play is in the drive shaft when it really is not there. We advise checking these two items carefully and if source of trouble is located, make the necessary replacements.

### STEARNS REAR AXLE ADJUSTMENT

Q—Give the adjustment of the pinion and ring gear of the "Stearns-Knight."—Wm. Sticht, Jersey City, N. J.

The pinion can be adjusted by the nut and screws in the forward end of the differential which will allow the shaft holding the pinion to slide backward or forward as desired. The ring gear can be adjusted by the adjusting nuts which are held in place on each side of the differential housing. By releasing the cap screw which holds the adjustment it is possible to move the adjusting nuts so that the gear will move in either direction.

### CHANGING DIFFERENTIAL

Q—Could a spiral ring gear ratio 4 to 1 which was taken out of an Overland 90-T be put into an Overland 90, country club model in place of the straight tooth 3 1/2 to 1 gear?

2—Would it be possible to drill a hole in the valve tappets of an Overland 90 and put fibre in them in order to deaden the noise? Would this pay or not?

3—What other company besides the Thermold Hardy Co. could furnish a uni-

versal joint for an Overland 90?—Dee Davis, Decatur, Ill.

1—It is impossible to make this change because of the difference in construction of the rear axle housing.

2—Proper adjustment of the valve tappets should bring about a satisfactory quiet operation of the push rods without the necessity of installing fibre disks. We believe that the greatest part of the noise is due to the worn condition of the push rod guide. Instead of installing the fibre disks we advise purchasing new push rod guides.

3—A joint of the flexible disk joint type cannot be readily installed. We think that the most advisable thing to do is to purchase a universal joint from the Overland people as its cost and the cost of installation will be much less than it will if any other joint is used.

### FLOODING THE CARBURETER

Q—Explain cause of a car not starting until the carbureter float has been held down and carbureter flooded?

2—Would it be possible to use an L2 Stromberg carbureter with the present fuel if a hot tube is fitted in addition to the regular hot-air stove?—Reader, Green Bay, Wis.

1—Flooding the carbureter does two things that are advantageous in starting the cold engine. It raises the level of gasoline in the float chamber and supplies a fresh supply of gasoline.

2—This carbureter can be used but think it is advisable to install a hot spot instead of fitting a hot tube. The report of a test that was conducted by the technical department of MOTOR AGE to show the performance of the hot spot was published in the Nov. 11 issue.

### OIL PRESSURE

Q—What should the oil pressure gauge on Essex register when running at 10, 20 and 30 m.p.h. respectively?

2—Will a heavier grade of oil prevent oil pumping?

3—For power and quietness, how much

clearance must be allowed between the tappets and valve stems?

4—What is the proper size chains for 32 by 4 in. cord tire?

5—Is the gear ratio of the Essex roadster the same as the touring car?—W. J. Creson, Aurora, Oregon.

1—We cannot state just what the pressure should be at these specific speeds. A reading of from 2 to 3 lb. under fairly high speeds is correct and a pound pressure at low speeds is sufficient.

2—The use of heavier oil may have some effect on the oil pumping but it will not eliminate it. The oil pumping is due to a great extent to the clearance of the pistons and the amount of oil that the oil pump is handling.

3—The recommended clearances for tappets of the Essex engine are .004 on the intake and .008 on the exhaust. The exhaust tappet clearance can be checked by inserting an .008 feeler between the push rod adjusting screw and the valve stem, but the intake tappets must be adjusted with the .004 feeler inserted between the upper push rod and the rocker arm.

4—The proper size chains for 32 by 4 cord tires are 32 by 4 chains. There is some difference in size between a 32 by

4 fabrics and the same size cord tire but with a chain like the Weed chain there is enough of an allowance for this difference in size.

5—The gear ratio of the Essex touring car and roadster is the same, being 5.09 to 1. However, it is possible to get special gear ratios without additional cost.

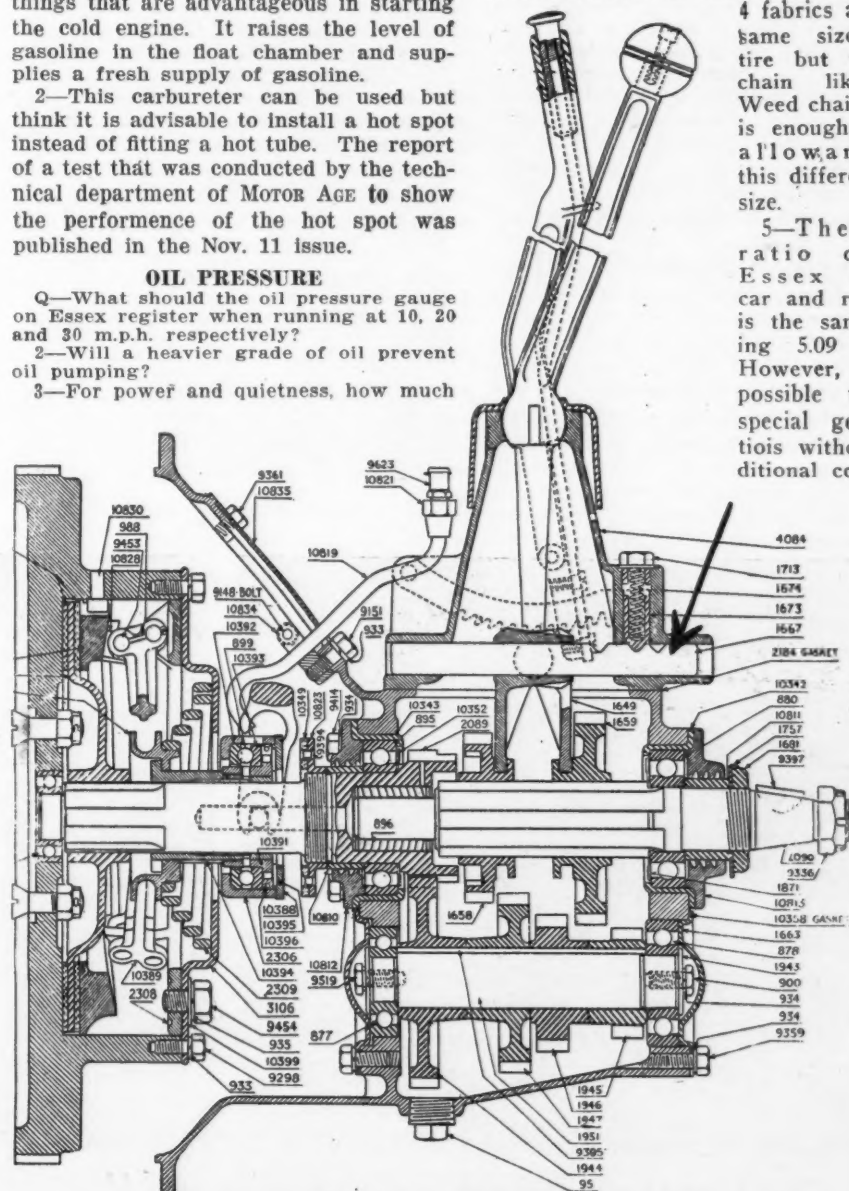


Fig. 8—1917 Chandler clutch and transmission

# Service Equipment

## Time Savers for the Shop

### Elwood Gravity Gauge

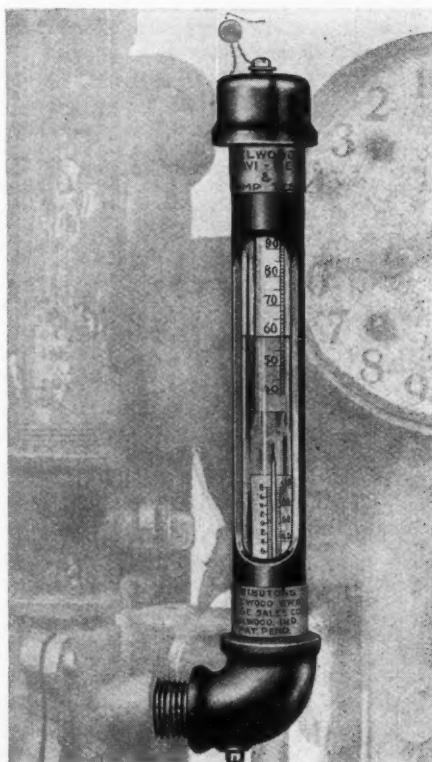
A means of assuring your customers that they are receiving correct measure when purchasing gasoline is provided in a gravity gauge recently invented by the Elwood Gravity Gauge Co., Elwood, Ind. This gauge shows the actual test of gasoline and is claimed to be absolutely accurate regardless of weather conditions. This enables the customer to determine at a glance the quality of the gasoline he is getting. If, through some defect in the pump, air is being given instead of liquid, it can be detected by the appearance of small bubbles which arise in the gravity meter. Any leaky foot valves, or loose connections also become evident at once with the use of this tester as it will not work correctly if the pump is out of order. It also converts the blind pump into a visible pump, for when the pressure is applied the liquid is visible pumping up and down in the gravi-meter. Many states are contemplating laws requiring a tester of some kind to be installed on gasoline pumps for the protection of the public which makes this invention very timely.

### Morrison Auto-Cradle

With the Morrison auto-cradle, an automobile or truck is turned over on its side in order to allow the mechanic to work in an upright position while repairing and adjusting the mechanism on the under parts of the machine. This device is a steel crate with gates at each end. An automobile or truck is held rigidly in position by means of the dogs (A). These dogs are adjustable either ver-



Bonney battery pliers



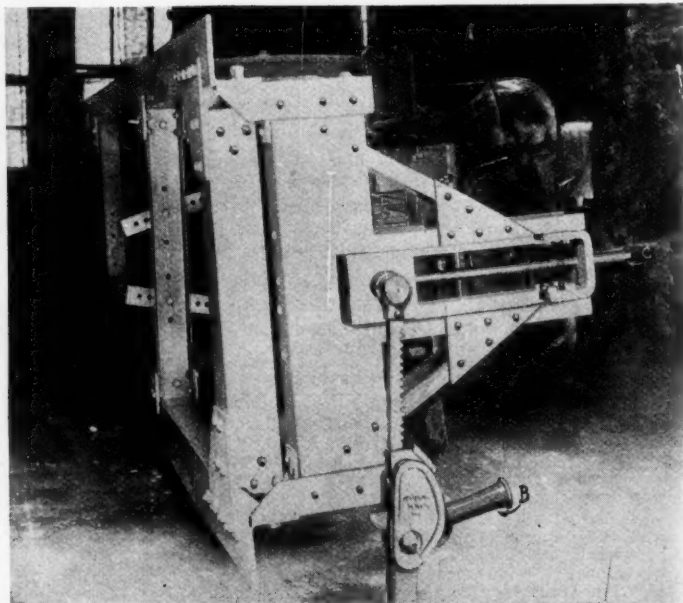
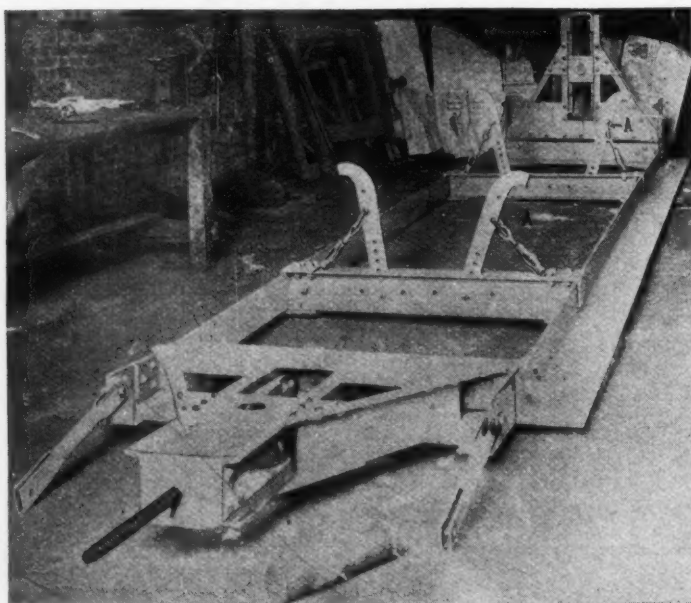
Elwood gravity gauge

tically or horizontally and after adjustment are kept in position by means of turnbuckles. The one gate which was open for entrance of the car or truck is then closed. The raising members are two quick-acting jacks; one at each end of the cradle (B). An approximate raise of 18 in. allows the cradle to be turned to any desired angle with ease.

On each of the two gates is mounted a lead screw (C) with trunnion nut, adjustable by means of a ratchet wrench. This arrangement enables the pivotal center of the cradle, including the car or truck, to be quickly found, thus enabling the whole weight to be turned on its axis with great facility and ease, according to the manufacturers. Another advantage of this auto cradle is that it enables the mechanics to make a quick survey and examination of a car when determining what repairs are necessary. This is a product of the Morrison Corp., Pittsburgh, Pa.

### Bonney Battery Pliers

These pliers are designed for gripping battery posts and terminals and the action is from any angle. The teeth are cross milled in double concave jaws. There are two adjustments, one for small posts, terminals and grease cups, and the other for large posts, terminals and grease cups. The action is the same in either adjustment. For battery work, best results will be obtained when two pliers are used. They are made from drop forged steel, and are 9 in. long. The Bonney Vise & Tool Works, Inc., Allentown, Pa., are the manufacturers.



Two views of the Morrison auto-cradle at left showing cradle in position to take car or truck, and at right showing car in place



# The Accessory Show Case

## New Fitments for the Car

### Matco Magneto Attachment

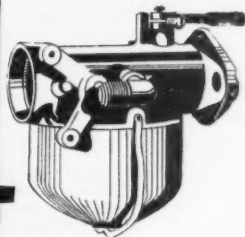
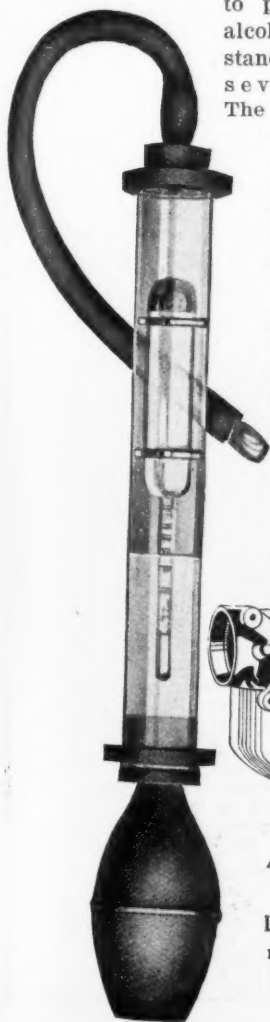
Adaptable for the Ford starting and lighting system, and claimed to fit any 1919 and up model of other cars electrically equipped, this gear-driven magneto attachment uses 45 deg. cut steel spiral gears, properly hardened. The particular feature claimed for this device is the placing of the magneto with the breaker and distributor in full view when hood is raised. The Magneto Attachment Co., 4077 Park Avenue, New York City, is the manufacturer.

### Radiometer

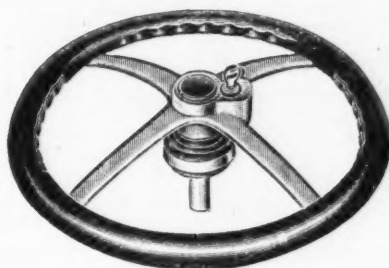
The radiometer is an instrument for testing radiator solutions for which the makers claim extreme simplicity and accuracy. A long flexible rubber tube permits easy access to the radiator solution, and a graduated chart on the float indicates the strength of solution necessary to withstand varying degrees of temperature. It is then an easy matter

to pour in enough alcohol to withstand even the most severe weather. The instrument works on the same principal as the Master hydrometer made by the same company.

The makers, Beckley - Ralston, Chicago, have introduced an innovation in supplying the radiometer in holly boxes for the Christmas trade.



Above: Neverfail Ford carburetor  
Left: Radiometer for testing solutions



Perry wheel lock

### Superior Governor

Built for the Fordson tractor, the Superior governor housed in a dust-proof aluminum case, fits into the recess occupied by the Fordson commutator case, the latter being raised and applied to the top of the governor. It is said the device can be installed in an hour; there are no holes to drill, and no additional tools, other than those that come with the tractor, are needed. Combination annular and thrust ball bearings to carry steel governor shaft are fitted.

It is claimed the installation of the governor will give uniform speed and increase power under all conditions, make the engine run cooler, reduce ignition trouble and wear and tear on parts. The Tractor Appliance Co., Shelbyville, Ill., manufactures this governor.

### Neverfail Carburetor for Fords

In this replacement carburetor complete vaporization takes place in a high vacuum. Gasoline from the fuel bowl is drawn through two jets by the suction of the vacuum, and enters the cylinders as a finely mixed fog. It is claimed that by this means an even, economical mixture at all speeds is obtainable. There are only three moving parts, and one adjustment—an air adjustment. Connections are all standard, making the installation simple. It sells for \$10, and is manufactured by the Neverfail Carburetor Co., 192 Jackson Ave., Long Island City, N. Y.

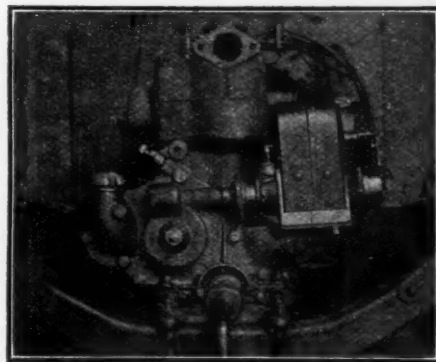
### Halliday Twin Bar Bumper

A new all steel spring bumper has been added to the line manufactured by the L. P. Halliday Co., Streator, Ill. The truss spring bumper feature which has characterized the Halliday line of bumpers is retained. The bar is finished either in black Japan with nickel end caps and name plate bolts or buff nickel plate over a heavy coat of buff copper, preventing rust. The concern supplies this bumper complete or with any of its regular or special fittings. The bumper is packed in a standard carton and its weight is 26 lb. The price in Japan finish and nickel plate finish is \$16 and \$18 respectively.

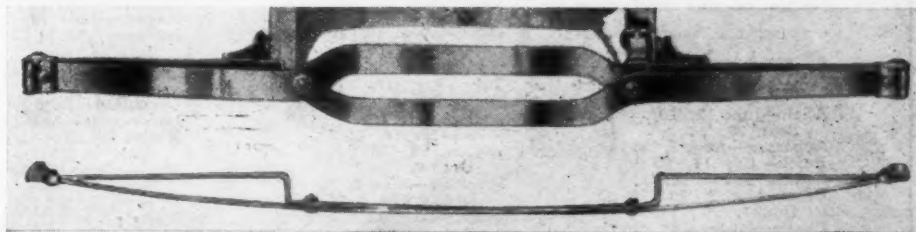
### Steering Wheel Lock

The new steering wheel lock for Fords recently put on the market by Perry Auto Lock Co., 2635 Michigan Avenue, Chicago, is an improvement over steering wheel locks manufactured in the past. It is neat in design, does not necessitate reaching under the wheel for the lock, and is simple to install.

Instead of disengaging steering pinion, the wheel disengages from its own hub, and does not change or affect original working parts of car. This lock does not require ball bearings. Disengagement is in the lock itself.



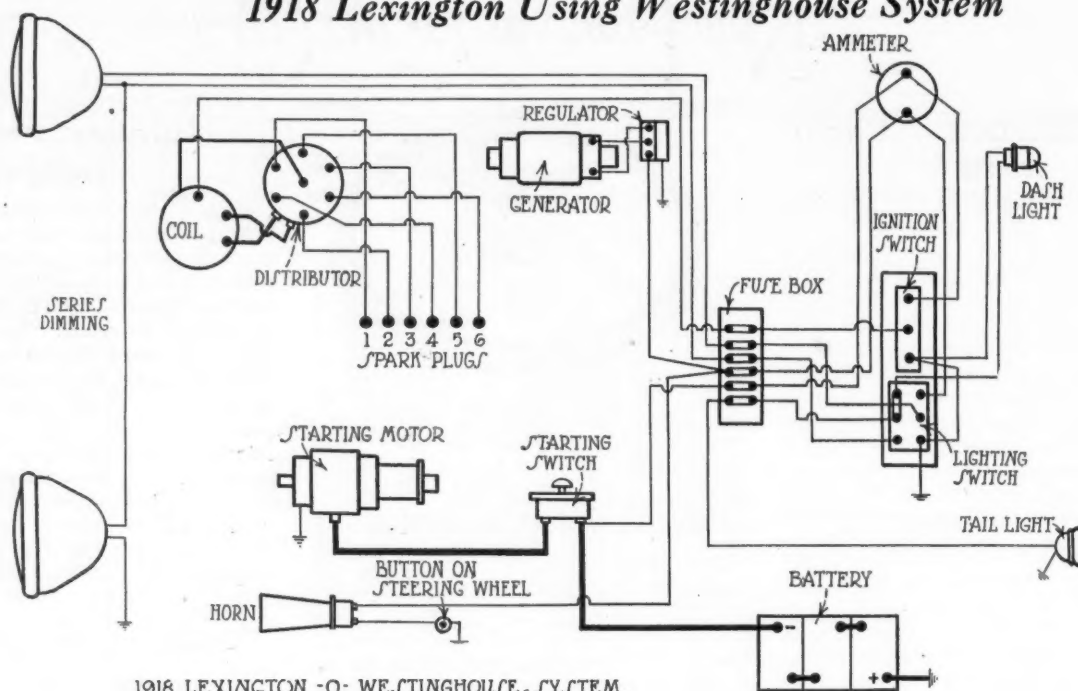
Matco magneto attachment



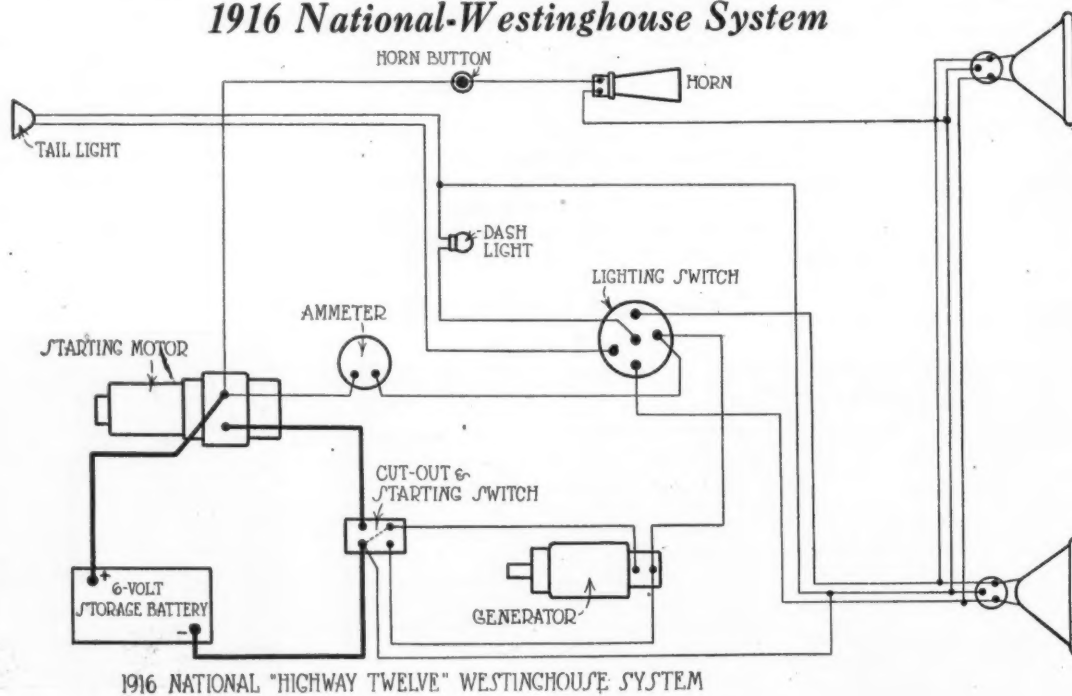
Halliday spring bumper

# Motor Age Weekly Wiring Chart No. 108

## 1918 Lexington Using Westinghouse System



## 1916 National-Westinghouse System



Name of car and date on which wiring diagrams have appeared in previous issues

Allen—June 17, '20  
Sept. 30, '20  
Apperson—Aug. 5, '20  
Buick—July 15, '20  
Cadillac—Nov. 18, '20  
Case—Aug. 5, '20  
Oct. 7, '20  
Chalmers—June 17, '20

Cole—June 10, '20  
Crow-Elkhart—July 29, '20  
Davis—Aug. 12, '20  
Sept. 2, '20  
Dorris—Dec. 9, '20  
Dort—Aug. 12, '20  
Dodge—Sept. 23, '20  
Nov. 11, '20  
Elcar—May 6, '20  
Oct. 28, '20  
Dec. 2, '20  
Franklin—June 3, '20  
Grant—Aug. 12, '20  
Nov. 23, '20

Harroun—July 15, '20  
Haynes—June 24, '20  
Jordan—June 10, '20  
July 22, '20  
Kissel—Aug. 19, '20  
Oct. 21, '20  
Lexington—July 29, '20  
Locomobile—June 3, '20  
Moline-Knight—July 22, '20  
Nov. 4, '20  
Moon—July 29, '20  
Aug. 19, '20  
Sept. 2, '20  
Moore—Nov. 11, '20  
Oldsmobile—Sept. 16, '20

Nov. 25, '20  
Packard—Oct. 7, '20  
Peerless—Nov. 18, '20  
Pierce-Arrow—July 15, '20  
Reo—July 22, '20  
Roamer—Aug. 5, '20  
Sept. 30, '20  
Oct. 21, '20  
Saxon—Sept. 9, '20  
Scripps-Booth—Aug. 26, '20  
Stearns—Nov. 4, '20  
Stephens—Sept. 16, '20  
Studebaker—July 1, '20  
Oct. 28, '20  
Stutz—July 8, '20



# Gear Ratios of 1920 Trucks

## Motor Age Maintenance Data Sheet No. 128

One of a series of weekly pages of information  
valuable to service men and dealers—save this page

### Continued from Last Week

Trade Name	Model	Capacity	1st Speed	2nd Speed	3rd Speed	4th Speed	Reverse	Rear Axle Ratio
Menominee.....	HT	1	3.68	1.86	1.	....	4.66	7.75
Menominee.....	H	1½	3.68	1.86	1.	....	3.2	8.25
Menominee.....	D	2	5.20	3.7	1.86	1.	4.66	8.66
Menominee.....	G	3½	5.20	3.68	1.86	1.	4.66	10.33
Menominee.....	J3	5	5.20	3.68	1.86	1.	4.66	11.66
Moreland.....	20N	1	4.84	2.62	1.76	1.	5.61	5.6
Moreland.....	20B	1½	4.84	2.62	1.76	1.	5.61	7.
Moreland.....	20C	2½	4.84	2.62	1.76	1.	5.61	6.8
Moreland.....	20G	3½	4.84	2.84	1.5	1.	5.81	7.8
Moreland.....	20J	5	4.84	2.84	1.5	1.	5.81	10.25
Mutual.....	2A	2	4.8	3.0	1.6	1.	6.5	7.34
Mutual.....	2AP	2½	4.8	3.0	1.6	1.	6.5	7.34
Napoleon.....	9	1	3.	1.7	1.	....	3.5	6.00
Napoleon.....	11	1½	3.	1.7	1.	....	3.5	8.00
Nash.....	2018	1	3.3	1.8	1.	....	3.9	6.83
Nash.....	3018	2	4.4	3.0	1.8	1.	5.2	8.00
Nelson & LeMoon.....	F	1½	3.2	1.8	1.	....	3.9	6.75
Nelson & LeMoon.....	F	2	3.6	1.9	1.	....	4.3	7.00
Nelson & LeMoon.....	F	3½	4.1	2.6	1.4	1.	4.9	8.75
Nelson & LeMoon.....	FC	5	4.1	2.6	1.4	1.	4.9	10.33
Netco.....	H	2	4.	1.76	1.	....	4.93	....
Netco.....	H	2½	4.	2.62	1.5	1.	4.81	....
Niles.....	E	2	1.6	3.2	1.	....	4.3	8.50
Noble.....	A20	1	3.	1.7	1.	....	3.5	7.80
Noble.....	B30	1½	4.	1.7	1.	....	3.5	7.75
Noble.....	C40	2	4.	1.7	1.	....	3.5	7.75
Noble.....	D50	2½	4.8	3.	1.6	1.	6.5	7.75
Noble.....	E70	3½	4.99	3.16	1.79	1.	4.78	8.75
Northway.....	B2	2	4.8	3.	1.6	1.	6.5	7.75
Northway.....	B3	3½	4.8	3.	1.6	1.	6.5	10.25
Norwalk.....	E	....	3.	1.89	1.	....	3.62	7.75
Ogden.....	A	1½	1.3	1.2	1.	....	1.5	....
Ogden.....	C2	2½	1.4	1.2	1.2	1.	1.5	8.75
O. K.....	K	1½	3.	1.7	1.	....	3.5	7.75
O. K.....	L	2½	4.8	3.	1.6	1.	6.5	8.66
O. K.....	M	3½	6.	3.2	1.7	1.	6.3	10.00
Old Hickory.....	W	1¼	2.98	1.75	1.	....	3.9	1.00
Old Reliable.....	A	1½	4.8	3.	1.6	1.	6.5	7.75
Old Reliable.....	B	2½	4.8	3.	1.6	1.	6.5	7.75
Old Reliable.....	C	3½	4.8	3.	1.6	1.	6.5	8.75
Old Reliable.....	D	5	4.75	2.94	2.02	1.	5.87	8.75
Old Reliable.....	K	7	5.55	3.46	2.3	1.	6.63	10.86
Oldsmobile Economy...	T	¾	3.52	1.73	1.	....	3.96	....
Olympic.....	2	2½	5.20	3.68	1.86	1.	4.66	....
Oneida.....	B9	1¾	4.	1.7	1.	....	3.5	8.25
Oneida.....	C9	2½	4.8	3.	1.6	1.	6.5	16.00
Oneida.....	D9	3½	4.8	3.	1.60	1.	6.5	10.00
Oneida.....	E9	5	6.	3.2	1.7	1.	6.3	11.6
Orleans.....	....	1½	3.0	1.69	1.	....	6.5	....
Orleans.....	....	2½	4.82	3.	1.6	1.	6.49	....
Oshkosh.....	....	2	4.	2.61	1.5	1.	4.8	....
Packard.....	EC	....	4.59	2.57	1.48	1.	6.0	7.25
Packard.....	ED	....	4.59	2.57	1.48	1.	6.0	9.00

(Continued next week)

# The Automotive Repair Shop

## Practical Maintenance Hints

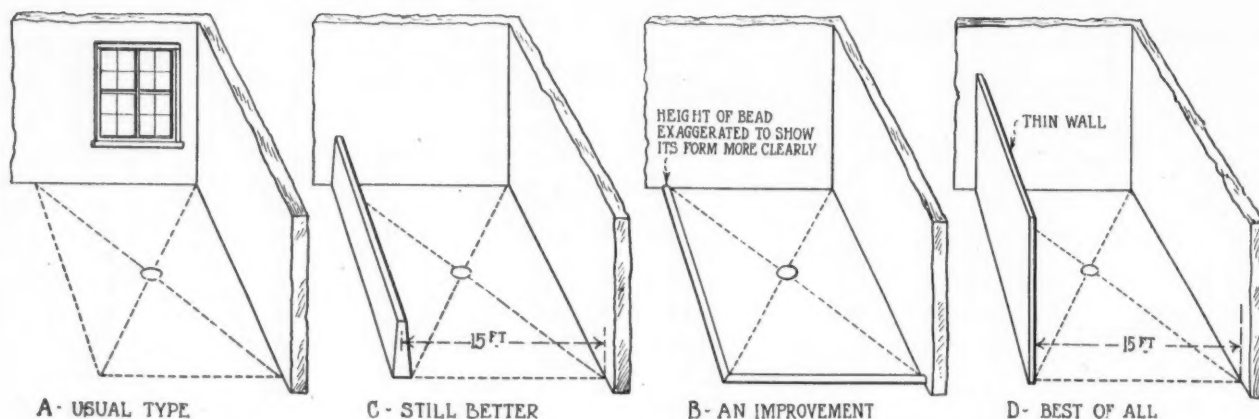


Fig. 1—Four ways of arranging washrack in a corner of the garage, showing the best

## Time Saving Equipment for Washing Cars

TO wash a car well in minimum time demands adequate equipment. It is not enough to have first-class workmen. If the equipment is not the best, either time will be wasted or inferior results will be obtained.

The first essential is a good washrack. It should be roomy and well drained. It should be about 15 by 20 ft. and have a slope toward the drain hole in the center of  $\frac{1}{2}$  in. to the foot.

The position of the washrack is important. It should not be placed in the aisle if much day washing is done. With night washing it may cause no difficulty to have it at the end of the aisle. On the other hand, if most of the washing is done in the day time, it is feasible to make this space do double duty—as a washrack in the day time and as storage space for two cars at night. Hence, it is desirable to make the washrack 15 ft. wide, which is ample for storing two cars. In fact, it is good practice, regardless of when the washrack is used, to make it 15 ft. wide and facing the aisle so that whenever it is not in use it may be employed for car storage.

### Where Light Is Best

It should be located where light is best, if used in the day time. At the same time it should not be placed near the garage entrance if the winter climate is cold, as the continual opening of the big door will make washing in the vicinity uncomfortable.

For the sake of good light and ventilation and to confine the splashing water it is advisable to locate the washrack in the corner of the building, A, Fig. 1.

To confine the water and dirt a concrete bead 2 or 3 in. high on the two

open sides of the washrack may be used as shown at B, Fig. 1.

A still more desirable improvement, consisting of a concrete partition wall about 3 ft. high is shown at C. This helps greatly in confining the water and preventing adjacent cars from being splashed.

The most satisfactory design, however, is the use of a thin partition placed along the third side, shown at D. This wall need not necessarily extend to the ceiling but should be 6 or 8 ft. high. It may be constructed of thin hollow tile made especially for building thin walls of this sort.

### Traveling Washrack

The so-called traveling washrack has much to recommend it. It was originated in that mammoth New York garage, the Hudson. Each broad aisle is divided into squares with a drain in the center of each square and the sides of the square

sloping slowly toward the center so that to place any car on the washrack means simply to push it forward out of its berth into the aisle.

Instead of having a separate overhead washer, lights and other necessary equipment is hung from an overhead platform which slides up and down the aisle on two rails, suspended from the ceiling.

Brilliant lights which focus directly on the work are mounted at the four corners of the platform, and from it may be hung a rotary overhead washer of the usual type, or, a convenient compromise, two lengths of hose, each hanging from diagonal corners. Curtains are hung at the sides so adjacent cars will not be splattered, but the ends are left open for convenience, light and ventilation.

Water and electric connections are made conveniently at a nearby post.

This washer it suited particularly for

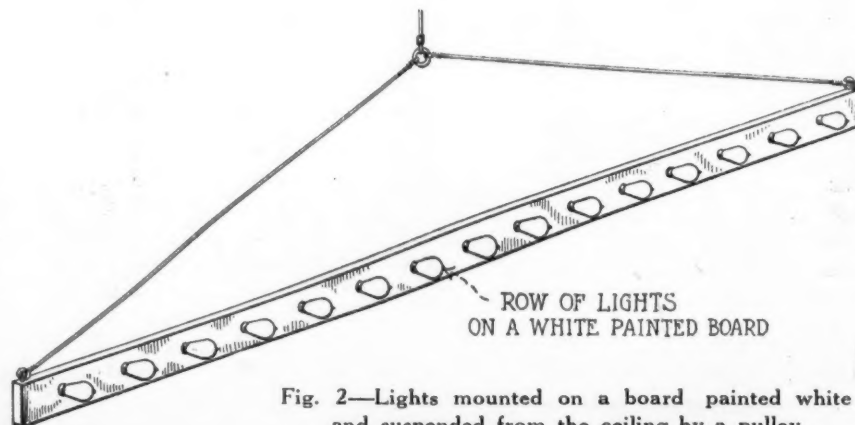


Fig. 2—Lights mounted on a board painted white and suspended from the ceiling by a pulley



night work, when traffic in the aisle is very slight.

It minimizes the handling inasmuch as the car is only moved from its space into the aisle instead of being transported to some distant point, and it practically eliminates damaged fenders and other car blemishes which are incident to pushing or driving the car to the washrack and back again. Practically all complaints from owners will vanish if the movement of cars is limited, as it can be limited only by the use of the traveling washrack.

For any type of washrack, traveling or stationary, a rotary overhead washer is advisable. For the man who desires to build his own, the design in Fig. 6 is offered as simple and at the same time quite satisfactory. The hose is carried on a triangular member hung from the ceiling, which allows the hose to be swung through a circle. The hose is looped generously under the center of rotation so that continuous use will not flex it unduly. This by the simple expedient of looping the hose the need for an expensive and troublesome joint at this point is done away with. To prevent undue twisting of the hose a stop is provided so that the swinging arm of the washer cannot be swung through more than one revolution.

#### Turning on Water

The water is turned on through the operation of a valve mounted on the ceiling and closed by a spring. A small cable runs from the lever on this valve over two pulleys, as shown by the dotted line, and is connected to the lower end of the hose in such a manner that a pull on the hose automatically opens the valve.

The sediment which collects on the washrack frequently settles in the drain and causes trouble. To eliminate this difficulty it is well to have a sediment pot incorporated in the construction of the drain. Fig. 3 shows the idea. The pot may be an ordinary garbage pail, so the hole should be just large enough to receive it snugly, the top of the hole

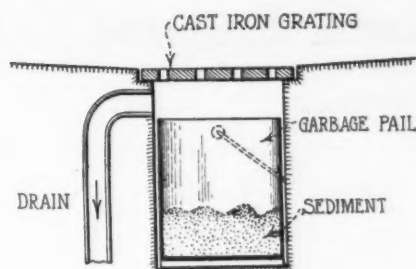


Fig. 3—Sediment pot incorporated in drain

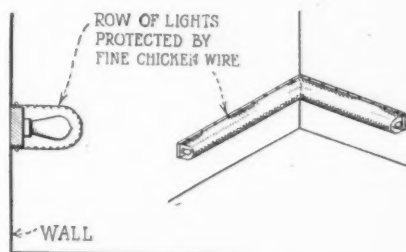


Fig. 4—Lights mounted permanently along the wall and protected by chicken wire

being closed by a cast-iron cover. The water runs off through a drain pipe at one side, and the sediment falls to the bottom of the can, which may be emptied as often as necessary.

The lighting of the washrack is very important, as good work cannot be done with poor light. The electric lamps shown in the illustration of the traveling washrack, Fig. 5, are very satisfactory. Clusters of lights on a portable stand are also good. Another good idea is to mount a row of lights in a white-painted board, Fig. 2, and suspend this from a pulley in the ceiling so that the lights may be hauled up out of the way when not in use. Fig. 4 illustrates a similar idea in effect, but in this case the lights are mounted permanently along the wall and are protected from damage by fine chicken wire. Obviously, there are many variations of these lighting suggestions.

White-painted walls are advisable for the washrack to conserve light. This suggestion is particularly feasible with the thin-wall type, D, Fig. 1.

Hose equipment should be kept in good condition, and the stream of water should be ample. A small stream is a time waster.

There should be separate sponges and chamois for the car body and the running gear, and under no circumstances should the one be used on the other.

For comfort in cold weather provision should be made for tempering the cold water with warm as it issues from the hose. In other words the hose should be connected to cold and warm water supplies so that the exact temperature required can be obtained without difficulty.

A special coal hot-water heater will be found the most economical and satisfactory method of obtaining hot water in quantities, but gas heaters, or a hot-water back in the furnace, also may be used.

### Oversize Tires

When oversize tires are put on be sure there is sufficient clearance between all tires and adjacent parts of the car. It is especially important to note this when the car is heavily loaded, as then the overhead clearance between wheels and fenders is at its minimum. Look carefully to see whether if when the springs are severely compressed, as when striking a large bump, there is any danger of the tires coming in contact with anything which might injure them.

### To Cure Grabbing Clutch

When a leather-faced clutch grabs—does not engage smoothly—clean the surface of the leather with kerosene and then apply neatsfoot or castor oil to the surface to soften the leather, thus insuring easy engagement. If the clutch slips, clean the leather with kerosene to remove any excess oil. If slipping still continues, sprinkle Fuller's earth on the surface.

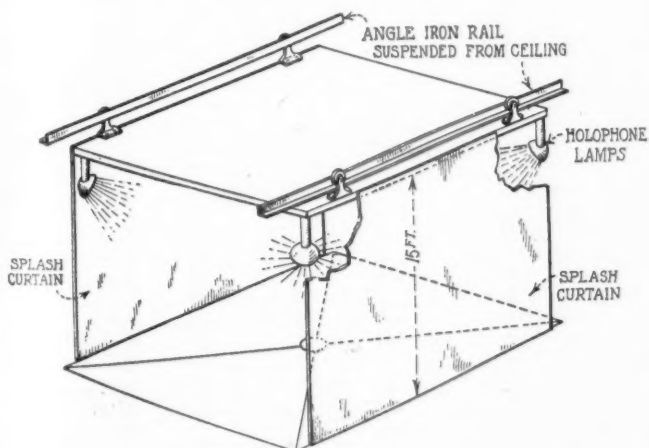


Fig. 5—Traveling washrack which originated in the New York Hudson garage

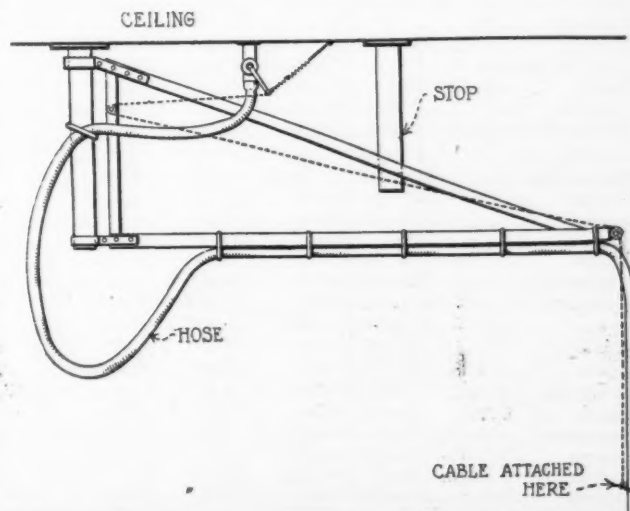


Fig. 6—Rotary overhead washer which can be used for any type of washrack

## Specifications of the Electrical Equipment Found on 1920 Passenger Cars

Make and Model	IGNITION			GENERATOR		MOTOR		BATTERY			Wiring System	Units Combined	FUSES		
	System	Make	Control	Make	Voltage	Make	Voltage	Make	Amp. Hr.	Voltage			Type	Volts	Amps
Allen.....43	Single	Conn.	Hand	West	6	West	6	U. S. L.	90	6	1	GI.	GT.	6	15
American.....C	Single	Conn.	Hand	G & D	6	G & D	6	Willard	110	6	1	S.	3-A.	1.250	20
Anderson.....All	Single	Remy	Hand	Remy	6	Remy	6	Willard	90	6	1	S.			
Apperson.....All	Single	Remy	Hand	Bijur	6	Bijur	6-8	Willard	90	6	1	S.	Open	1.250	10
Auburn.....6-39	Single	Remy	Hand	Remy	6	Remy	6	Willard	90	6	1	S.		6-8	25
Beggs.....20-T		Conn.	Hand	A-L	6	A-L	6	Exide	90	6	1	GT.	Cart	6	15
Bour-Davis.....21	Single	West	Hand	West	6	West	6	Willard	111	6	1	S.	GT.	6	15
Brewster.....Single		Berling	Hand	U. S. L.	12	U. S. L.	12	U. S. L.			1				
Briscoe.....4-34	Single	Conn.	Hand	A-L	6	A-L	6	Prest-O-L.	80	6	1	GI.	GT.	6	20
Buick.....Single		Delco	Hand	Delco	6	Delco	6	Willard	100	6	1	S.			
Cadillac.....59	Single	Delco	H. & A.	Delco	6	Delco	6	Exide	130	6	1	GM.			
Case.....V-20	Single	Delco	H. & A.	West	6	West	6	Willard	111	6	1	GI.	5AGT	50	
Chalmers.....35-C	Single		Hand		6		6		106	6	1	GI.	GT.	6	15
Champion.....KO	Single	Delco	Hand	Dyneto	6	Dyneto	6	Willard	90	6	1	S.	GT.	6	20
Chandler.....All	Single	Bosch	Hand	G & D	6	G & D	6	Prest-O-L.	105	6	1	S.	GT.	6	
Chevrolet.....All	Single	Remy	Hand	A-L	6	A-L	6	Willard	111	6	1	GI.	GT.	6	
Cleveland.....40	Single	G & D	Hand	G & D	6	G & D	6	Prest-O-L.	94	6	1	S.	GT.	6	20
Cole.....All	Single	Delco	H & A.	Delco	6	Delco	6	Prest-O-L.		6	1	S.			
Columbia.....All	Single	At-Kent	Hand	A-L	6	A-L	6	Prest-O-L.	80	6	1	S.			
Comet.....C-53	Single	Wagner	Hand	Wagner	6	Wagner	6	Willard	111	6	1				
Commonwealth.....42	Single	At-Kent	Hand	Dyneto	6	Dyneto	6	Prest-O-L.	105	6	1		GT.		
Crow-Elkhart.....L-55	Single	Conn.	Hand	Dyneto	6	Dyneto	6	Exide	120	6	1		Cart	6	10
Cunningham.....V-4	Single	Delco	H & A.	Delco	6	Delco	6	Willard	132	6	1				
Daniels.....8-D	Single	Delco	H & A.	Delco	6	Delco	6	Willard	132	6	1	S.			
Davis.....51	Single	Delco	Hand	Delco	6	Delco	6	Willard	90	6	1	S.			
Dixie Flyer.....Single		Eisemann	Hand	Dyneto	6	Dyneto	6	Willard	90		2				
Dodge Brothers.....Single		Own	H & A.	N. E.	12	North East	12	Willard	49	12	1	GM.	Encl	1-50	10
Dorris.....6-80	Single	Bosch	Hand	West	6	West	6	Willard	102	6	1	S.	GT.	5-8	15
Dort.....15	Single	Conn.	Hand	West	6	West	6	U. S. L.	85	6	1	S.		6	10
du Pont.....A	Single	Eisemann	H & A.	West	6	West	6	Exide	115	6	1	S.			
Economy.....6-46	Single	Own	Hand	A-L	6	A-L	6	Willard	84	6					
Elcar.....All	Single	Delco	Hand	Delco	6	Delco	6	Willard	90	6	1	S.	GT.	6-8	20
Elgin.....K	Single	Wagner	Hand	Wagner	6	Wagner	6	Willard	90	6	1		GT.	6-8	20
Essex.....A	Single	Delco	H & A.	Delco	7	Delco	6	Exide	105	6	1	S.			
Ferris.....Single		Splitdorf	Hand	L-N	6	L-N	6	Willard	132	6	1	S.		6-8	
Ford.....T <sup>a</sup>	Single	Own	Hand	Own	6	Own	6		80	6	1	S.			
Franklin.....9-B	Single	At-Kent	Auto	Dyneto	12	Dyneto		Willard	67	12	2	GM.	GT.	14	10
Gardner.....O	Single	West	Hand	West	6	West	6	Willard	90	6	1	S.	GT.	6	20
Geronimo.....Single		Delco	Hand	Dyneto	6	Dyneto	6	Exide	90	6	1	S.	none	6	
Globe 4.....B-10	Battery	Delco	Hand	Delco	6-8	Delco	6-8	Exide	105	6	Grounded	3 Separate	Delco Switch with vibrator		
Grant.....H	Single	At-Kent	Hand	Bijur	6	Bijur	6	Prest-O-L.	90	6	1	S.	2GT	6-8	15
Handley-Knight.....Single		Conn	Hand	A-L	6	A-L	6	U. S. L.	162.6	6	1	S.	GT.	6-8	20
Hanson.....54-A	Single	Delco	Hand	Delco	6	Delco	6	Prest-O-L.	100	6	2				
Harroun.....Single		Remy	Hand	Remy	6	Remy	6	Prest-O-L.	80	6	1				
Harvard.....All	Single	Bosch	Hand	Dyneto	6	Dyneto	6	Prest-O-L.	120	6	1	S.			
Hatfield.....A		Conn.		Dyneto	6	Dyneto	6	Willard	111	6	1	GI.			
Haynes.....47	Single	Kingston	Hand	Leece-N.	6	Leece-N.	6	Willard	132	6	1	GI.	GT.	6	
H. C. S. Special.....Single		Delco	Hand	Delco		Delco		Willard	111						
Hollier.....200-B	Single	West	Hand	West	6	West	6	U. S. L.	80	6	1	S.	GT.	6	20
Holmes.....Single		Eisemann	Auto	Dyneto	12			Willard	69	12	2	S.	GT.	15	15
Hudson Super-Six.....Single		Delco	H & A.	Delco	7	Delco	7	Exide	105	6	1	GM.			
Huffman.....Single		Conn.	Hand	Dyneto	6	Dyneto	6	Willard	90	6	1	S.		6	25
Hupmobile.....R	Single	At-Kent	Hand	West	6	West	6	Willard	90	6	1	S.	Encl	6	10
Jackson.....6-38	Single	Remy	Hand	A-L	6	A-L	6	U. S. L.	94	6	1	GI.	GT.	6-8	15
Jones.....All	Single	Remy	Hand	A-L	6	A-L	6	Prest-O-L.	120	6	1	GI.	GT.	6	20
Jordan.....F	Single	Delco	Hand	Delco	6	Delco	6	Willard	90	6	1	S.	C. B.		
Jordan.....M	Single	Delco	Hand	Delco	6	Delco	6	Willard	90	6	1	S.	C. B.		
Kenworthy.....4-80	Single	Bosch	Hand	Bijur	6	Bijur	6	Exide	140	6	1	S.		6	10
Kenworthy.....6-55	Single	Bosch	Hand	West	6	West	6	Exide	140	6	1	S.		6	10
King.....8	Single	At-Kent	Hand	West	6	West	6	Prest-O-L.	120	6	1	S.	Cart	6	10
Kissel.....All	Single	Remy	Hand	Remy	6	Remy	6	Willard	111	6	1	S.	3 A. G.	6	20
Kline.....6-55-J	Single	Conn.	Hand	Wagner	6	Wagner	6	Prest-O-L.	80	6	1	S.	5 A. G.	6	
LaFayette.....Single		Delco	H & A.	Delco	6	Delco	6	Exide	130	6	1	GM.	C. B.		
Leach.....Double		Delco	Hand	Delco	6	Delco	6	Prest-O-L.	180	6	1	S.	Cart	6	15
Lexington.....S-20	Single	Conn.	Hand	G. & D.	6	G. & D.	6	Willard	111	6	1		GT.	6	15
Liberty.....10-C	Single	Wagner	Hand	Wagner	6	Wagner	6	Prest-O-L.	90	6	1	GI.			
Locomobile.....48-6-7	Dual	Berling	Hand	West	6	West	6	Exide	150	6	1	S.	G. T.	6	10
Lorraine.....Single		West	Hand	West	6	West	6	U. S. L.	94	6	1	S.	GT.		

ABBREVIATIONS: \*Starting and Lighting in closed models only. Ignition: At-K, Atwater-Kent; Conn., Connecticut; West, Westinghouse; Auto, Automatic; H & A, Hand and Automatic; S. A., Semi-Automatic. Generator: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; Ward-L, Ward-Leonard; N. E., North East; Split, Splitdorf. Motor: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; West, Westinghouse.



# Giving Ignition, Starting, Lighting, Battery, Lamp, Spark Plug and Horn Data

LAMP CANDLEPOWER, VOLTAGE AND TYPE OF BASE									SPARK PLUGS			Horn	Make and Model
Base Contact	HEADLIGHTS		SIDELIGHTS		TAILLIGHTS		DASHLIGHT		Make	Diam. Inches	Thread Pitch		
	Volts	CP.	Volts	CP.	Volts	CP.	Volts	CP.					
Single...	6-8	18	*6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Klaxon...	Allen.....43
Single...	6-8	15	*6-8	5	3-4	2	d3-4	2	Bethlehem...	7/8	18	Sparton...	American.....C
Single...	6-8	17			6-8	2	6-8	2	A. C. ....	7/8	18	E. A. L. ...	Anderson.....All
Double...	6-8	18	*6-8	4	d6-8	2	d6-8	2	A. C. ....	7/8	18	Sparton...	Apperson.....All
Single...	6-8	15	*6-8	4	6-8	2	6-8	2	Rajah.....	7/8	18	E. A. ....	Auburn.....6-39
Single...	6-8	21	6-8	4	3-4	2	3-4	2	Champion...	7/8	18	Trojan...	Beggs.....20-T
Single...	6-8	21	6-8	5	6-8	2	6-8	2	A. C. ....	7/8	18	Trojan...	Bour-Davis....21
Single...	12	36	12	4	6-8	2	d6-8	2	Herz-Boug...	7/8	18	Klaxon...	Brewster.....
Single...	6-8	21			6-8	2	d6-8	2	Champion...	7/8	18	Sparton...	Briscoe.....4-34
Single...	6-8	21	6-8	5	6-8	2	6-8	2	A. C. ....	7/8	18	Schwarze...	Buick.....
Single...	7	18	8	6	4	2	3-4	2	Titan.....	7/8	18	Delco....	Cadillac.....59
Single...	6-8	21	6-8	4	6-8	2	6-8	2	A. C. ....	7/8		Klaxon...	Case.....V-20
Single...	6-8	15	6-8	4	6-8	2	6-8	2		7/8	18		Chalmers....35-C
Single...	6-8	15			6-8	2	6-8	2	A. C. ....	7/8	18	Garford...	Champion....KO
Single...	6-8	15	6-8	4	6-8	2	6-8	2	A. C. ....	7/8	18	Klaxon...	Chandler.....All
Single...	6-8	21	6-8	4	6-8	2	d6-8	4	A. C. ....	7/8	18	Klaxon...	Chevrolet....All
Single...	6-8	17	6-8	4	6-8	2	6-8	2	A. C. ....	7/8	18	Klaxon...	Cleveland....40
Single...	6-8	21	*6-8	5	6-8	4	d6-8	5	A. C. ....	7/8	18	Sparton...	Cole.....All
Single...	6-8	15	*6-8	4	6-8	2	d6-8	2	Champion...	7/8	18	Schwarze...	Columbia....All
Single...	6-8	18			6-8	2	6-8	4	A. C. ....	7/8	18	Klaxon...	Comet.....C-53
Single...	6-8	21	6-8	4	6-8	2	d6-8	2	A. C. ....	7/8	18	E. A. L. ...	Commonwealth.42
Single...	6-8	15	6-8	4	6-8	2	d6-8	2	Champion...	7/8	18	E. A. Lab..	Crow-Elkhart..L-55
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Sparton...	Cunningham....V-4
Single...	6-8	21	6-8	4	6-8	2	d6-8	2	A. C. ....	7/8	18	Klaxon...	Daniels.....8-D
Single...	6-8	21			6-8	2	6-8	2	A. C. ....	7/8	18	Klaxon...	Davis.....51
Double...	6-8	15			d3-4	2	d3-4	2	Champion...	7/8	18	Garford...	Dixie Flyer...
Single...	12-16	15			12-16	2	12-16	2	A. C. ....	7/8	18	NorthEast	Dodge Brothers.
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Opt. ....	7/8	18	Klaxon...	Dorris.....
Single...	6-8	15			6-8	2	d6-8	2	A. C. ....	7/8	18	Schwarze...	Dort.....15
Single...	6-8	21	6-8	4	6-8	2	6-8	2	A. C. ....	7/8	18	Klaxon...	du Pont.....A
Single...													Economy.....6-46
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	E. A. L. ...	Elcar.....All
Single...	6-8	21			6-8	2	6-8	2	Champion...	7/8	18	E. A. L. ...	Elgin.....K
Single...	6-8	15			3-4	2	*3-4	2	A. C. ....	18 m.m.	1.5 m.m.	Sparton...	Essex.....A
Single...	6-8	21	6-8	6	6-8	2	6-8	4	Champion...	7/8		Klaxon...	Ferris.....
Sgl.&Dbl.	6-8	17	6-8	2	6-8	2			Champion...	1 1/2	pipe	Own.....	Ford.....T
Double...	12-16	15	*12-16	4	6-8	2	6-8	2	Opt. ....	7/8	18	Klaxon...	Franklin.....9-B
Single...	6-8	15			6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Gardner.....G
Single...	6-8	21			6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Geronimo.....
Single...	6	21	6	2	6	2	6	2	Champion...	7/8	18	Sparton...	Globe 4.....B-10
Point													
Single...	6-8	15	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Trojan...	Grant.....H
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Sparton...	Handley-Knight.
Single...	6-8	15			6-8	3	6-8	3	Champion...	7/8	18	Schwarze...	Hanson.....54-A
Single...	6-8	15			3-4	2	d3-4	2	A. C. ....	7/8		Schwarze...	Harroun.....
Double...	6-8	21	6-8	5	6-8	2	6-8	2	Bethlehem...	7/8	18	Klaxon...	Harvard.....All
Single...	6-8	15	*4-8	4	6-8	4	6-8	2	A. C. ....	7/8	18	Ecco.....	Hatfield.....A
Single...	6-8	15	*6-8	12	6-8	2	6-8	2	A. C. ....	7/8	18	Klaxon...	Haynes.....47
Single...	6-8	15	6	4	3-4	2	3-4	2	A. C. ....	7/8	18	Sparton...	H. C. S. Special.
Double...	12-16	21			6-8	2	6-8	2	Bethlehem...	7/8	18	Sparton...	Hollier.....206-B
Single...	6-8	15	6-8	4	3-4	2	*3-4	2	A. C. ....	7/8	18	Klaxon...	Holmes.....
Single...												Sparton...	Hudson Super Six.
Single...													Huffman.....
Single...	6-8	15			6-8	2	6-8	2	A. C. ....	7/8	18	Trojan...	Hupmobile.....R
Single...	6-8	15	6-8	4	3-4	2	3-4	2	A. C. ....	7/8	18	Stewart...	Jackson.....6-38
Double...	6-8	15	*6-8	4	s6-8	2	s6-8	2	Champion...	7/8	18	Newton...	Jones.....
Single...	6-8	18	*6-8	4	6-8	3	6-8	3	A. C. ....	7/8	18	Sparton...	Jordan.....F
Single...	6-8	18	6-8	4	6-8	3	6-8	3	A. C. & Rajah	7/8	18	Sparton...	Jordan.....M
Single...	6	50	6	30	6	2	6	2	Rajah.....	7/8	18	Sparton...	Kenworthy....4-80
Single...	6-8	21	6		6-8	2	6-8	2	A. C. ....	7/8	18	Sparton...	Kenworthy....6-55
Single...	6-8	15	*6-8	4	6-8	2	6-8	2	Champion...	7/8	18	Sparton...	King.....8
Double...	6-8	18			d6-8	2	d6-8	2	A. C. ....	7/8	18	Sparton...	Kissel.....
Single...	6-8	15			6-8	2	d6-8	2	Champion...	7/8	18	Klaxon...	Kline.....6-55-J
Single...	6-8	21	6-8	4	3-4	2	3-4	2	A. C. ....	7/8	18	Klaxon...	LaFayette.....
Single...	6-8	32	6-8	5	6-8	2	6-8	2	Champion...	7/8	18	Klaxon...	Leach.....
Single...	6-8	21	6-8	4	6-8	2	d6-8	4	Bethlehem...	7/8	18	E. A. L. ...	Lexington....8-20
Single...	6-8	15	*6-8	4	6-8	2	d6-8	2	A. C. ....	7/8	18	United...	Liberty.....10-C
Single...	6-8	21	6-8	4	6-8	2	6-8	2	Titan.....	7/8	18	Klaxon...	Locomobile...48-6-7
Single...	6-8	17			6-8	2	6-8	2	A. C. ....	7/8	18	Schwarze...	Lorraine.....

Battery: Prest-O-Lite, Prest-O-Lite. Wiring system: GI, Generator and Ignition combined; GIM, Generator, Ignition, Motor combined; S, Generator, Motor Ignition separate; GM, Generator and Motor combined. Fuses: GT, Glass Tube; Cart, Cartridge; C. B., Circuit Breaker. Lamps: \*Dashlights in series with taillights; headlight contains sidelight; d, double contact; s, single contact.

## Specifications of the Electrical Equipment Found on 1920 Passenger Cars

Make and Model	IGNITION			GENERATOR		MOTOR	BATTERY				Wiring System	Units Combined	FUSES		
	System	Make	Control	Make	Voltage		Voltage	Make	Amp. Hr.	Voltage			Type	Volts	Amp.
Maibohm.....	B Single	At-Kent...	Hand...	Bijur.....	6	Bijur.....	6	Willard....	90	6	1	S.....	2-A.....	6	20
Marmon.....	34 Single	Delco.....	Auto.....	Delco.....	6	Delco.....	6	Willard....	153	6	1	GI.....			
Maxwell.....	25 Single	At-Kent...	Hand...		6		6	Prest-O-L..	87½	6	1	S.....	3A.....	6	20
McFarlan.....	127 Double	Opt.....	Hand...	West.....	6	West.....	6	Willard....	132	6	1	GI.....	5 A. G..	6	
Mercer.....	Ser. 5 Single	Eisemann..	Hand...	West.....	6	West.....	6	Willard....	153	6	1	S.....	Cart.....		10
Meteor.....	KR Single	Simms.....	Hand...	West.....	6	West.....	6	Willard....	118	6	1		5 A. G..	6	10
Metz, Master Six..	Single	Conn.....	Hand...	West.....	6	West.....	6	Willard....	111	6	1				
Mitchell.....	F-40 Single	Remy.....	Hand...	Remy.....	6	Remy.....	6	Willard....	90	6	1	GI.....	GT.....	6	10
Monitor.....	Single	Conn.....	Hand...	Dyneto....	6	Dyneto....		Prest-O-L..	110	6	1				
Moon.....	6-48 Single	Delco.....	Auto.....	Delco.....	6	Delco.....	6	Exide.....	120	6	1	S.....			
Moon.....	6-68 Single	Delco.....	Auto.....	Delco.....	6	Delco.....	6	Exide.....	120	6	1	S.....			
Moore.....	F Single	Conn.....	Hand...	A-L.....	3	A-L.....	6	Willard....	90	6	2				
Nash.....	Single	Wagner....	H & A...	Delco.....	6	Wagner....	6	Willard....	111	6	1	S.....			
National.....	Series BB Single	Delco.....	H & A...	West.....	6	West.....	6	Prest-O-L..	110	6	1	S.....	GT.....	6-8	5
Nelson.....	D Single	Bosch.....	Hand...	U. S. L....	12	U. S. L....	12	Willard....	69	12	2	S.....	G.....	12	5-30
Noma.....	1-B Single	Delco.....	Hand...	Delco.....	6	Delco.....	6	Willard....	90	6					
Norwalk.....	4-30KS Single	Delco.....	Dyneto....	Dyneto....	6	Dyneto....	6	Willard....	80	6	1			6	
Oakland.....	34-B Single	Remy.....	Hand...	Remy.....	6-8	Remy.....	6	Prest-O-L..	100	6-8	1	GI.....			
Ogren.....	6-60 Single	Bosch.....	Hand...	West.....	6	West.....	6	Willard....	111	6	1		Cart.....	6	10
Oldsmobile.....	37-A Single	Remy.....	Hand...	Remy.....	6	Remy.....	6	Willard....	80	6	1				
Oldsmobile.....	45-B Single	Delco.....	H & A...	Delco.....	6	Delco.....	6	Willard....	90	6	1				
Olympian.....	45 Single	Conn.....	Hand...	A-L.....	6	A-L.....	6	U. S. L....		6					
Overland.....	4 Single	Conn.....	Hand...	A-L.....	6-8	A-L.....	6	U. S. L....	80	6-8	1	GI.....	Glass....	6	20
Packard Single Six..	Single	Delco.....	H & A...	At-Kent...	6	At-Kent...	6			6-8		S.....		6	
Packard Twin Six..	Single	Delco.....	H & A...	Bijur.....	6	Bijur.....	6	Willard....	134	6	1	S.....	GT.....	6	10
Paige.....	All Single	At-Kent...	H & A...	G & D.....	6	G & D.....	6	Willard....	111	6	1	S.....	G.....		20
Pan-American.....	All Single	West.....	Hand...	West.....	6	West.....	6	Willard....	111	6	1	S.....	G.....	6	
Paterson.....	6-50 Dual	Delco.....	Hand...	Delco.....	6	Delco.....	6	Willard....	90	6	1				
Peerless.....	Ser. 6 Single	At-Kent...	H & A...	A-L.....	6	A-L.....	6	Willard....	125	6	1		GT.....	6	10
Piedmont.....	4-30 Single	Delco.....	Hand...	Dyneto....	6	Dyneto....	6	Willard....	90	6	1	S.....			
Piedmont.....	6-40 Single	Remy.....	Hand...	Remy.....	6	Remy.....	6	Willard....	90	6	1	S.....			
Pierce-Arrow.....	38&48 Double	Delco.....	H & A...	West.....	6-8	West.....	6	Willard....	153	6	1	S.....	GT.....	6-8	10
Pilot.....	6-45 Dual	Delco.....	Hand...	Delco.....	6	Delco.....	6	Prest-O-L..	80	6	1	GI.....			
Porter.....	46 Dual	Berling....	Hand...	West.....	12	West.....	12	Prest-O-L..	118	12	1	S.....	Cart.....	12	15
Premier.....	6-D Single	Delco.....	Hand...	Delco.....	6	Delco.....	6	Willard....	111	6	1	S.....			
Premo Car, 4-30&6-40	Conn.....	Dyneto....	Hand...	Dyneto....	6	Dyneto....	6	Willard....		6	1				
Ranger.....	B Single	Conn.....	Hand...	Bijur.....	6	Bijur.....	6	U. S. L....	80	6	1	S.....	GT.....	6	16
Reo.....	T & U Single	Remy.....	Hand...	Remy.....	6	Remy.....	6	Willard....	111	6	2	GI.....	Wire....	6	5
Reo.....	T 6& U6 Single	North East	Hand...	North East	6	North East	6	Willard....	111	6	1	S.....	Wire....	6	6
Revere.....	Single	Bosch.....	Hand...	West.....	6	West.....	6	Willard....	153	6	1	S.....	GT.....	6	15
Roamer.....	6-54E Single	Bosch.....	Hand...	Bijur.....	6	Bijur.....	6	Columbia..	117	6	1	S.....	3A.....	6	15
Roamer.....	4-75E Single	Bosch.....	Hand...	West.....	6	West.....	6	Columbia..	117	6	1	S.....	5 A. G..	6	15
R & V Knight.....	J & R Single	Wagner....	Hand...	Wagner....	6	Wagner....	6	Willard....	111	6	1	S.....	Cart.....	250	20
Saxon.....	125 Single	Remy.....	Hand...	Wagner....	6	Wagner....	6	Prest-O-L..	80	6	1	S.....	Cart.....	6-8	15
Sayers.....	C-P Single	Delco.....	Hand...	Delco.....	6	Delco.....	6	Willard....	90	6	1	GI.....	C.B.....		
Scripps-Booth.....	B Single	Remy.....	Hand...	Remy.....	6	Remy.....	6	Prest-O-L..	85	6	1	GI.....	GT.....	6	20
Seneca.....	L Single	Conn.....	Hand...	Allis Chalm	6	Allis Chalm	6	Prest-O-L..	88	6	1	GM.....			20
Severin.....	H Single	Wagner....	Hand...	Wagner....	6	Wagner....	6	Campbell..	110	6	1	None..	Cart.....	6	10
Singer.....	20 Single	Philbrin..	Hand...	West.....	6-8	West.....	6	Willard....	153	6	1	S.....	G. C.....	6	15-30
Skelton.....	35 Single	Conn.....	Hand...	West.....	6	West.....	6	Prest-O-L..	85	6	1	S.....		6	10
Spacke.....	S-20 Single														
Standard.....	8-I Double	Dixie.....	Hand...	West.....	6	West.....	6	Willard....	153	6	1	S.W....	2-A.....	6	15
Stanley.....	735 Single			Remy.....	6			Willard....	90	6	1	G.....	Cart.....	6	20
Stanwood.....	A Single	At-Kent...	Hand...	West.....	6	West.....	6	Willard....	153	6	1	S.....	Cart.....	6	10
Stearns.....	SKL-4 Single	At-Kent...	Hand...	West.....	12	West.....	12	Willard....	69	12	1	S.....	Cart.....	12	20
Stephens.....	80 Single	Conn.....	Hand...	A-L.....	6	A-L.....	6	U. S. L....	116	6	1	S.....	Cart.....	6	20
Stevens-Duryea...	E Double	Berling....	Hand...	West.....	6-8	West.....	6-8	Vester.....	120	6-8	1	S.....	Cart.....	6	15
Studebaker.....	All Single	Wagner....	Hand...	Wagner....	6	Wagner....	6	Willard....	111	6-8	1	S.....	Cart.....	6	10
Stutz.....	H Double	Hand...	Hand...	Remy.....	6	Remy.....	6	Willard....	132	12	1				
Templar.....	445 Single	Simms.....	Hand...	Bijur.....	6	Bijur.....	6	Prest-O-L..	100	6	1	S.....	Cart.....	6	20
Texan.....	B-38&A-38 Single	Conn.....	Hand...	Bijur.....	6	Bijur.....	6	Prest-O-L..	80	6	1	S.....	Cart.....	6	20
Tulsa.....	E-1,2,3 Single	Conn.....	Hand...	Dyneto....	6	Dyneto....	6	Exide.....	90	6	1	S.....	GT.....	6	15
Velie.....	34 Single	At-Kent...	S. A.....	West.....	6	West.....	6	Willard....	108	6	1	S.....	Wire....		15
Velie.....	48 Single	At-Kent...	S. A.....	Bijur.....	6	Bijur.....	6	Willard....	111	8	1	S.....	Wire....		15
Vogue.....	6-55 & 6-66 Single	Conn.....	Hand...	A-L.....	6	A-L.....	6	Willard....	111	6	1		Cart.....	1-250	15
Wasp.....	Single	Bosch.....	Hand...	West.....	6	West.....	6	Exide.....	135	6	1	S.....	Cart.....	6	20
Westcott.....	C-38&C-48 Single	Delco.....	H & A...	Delco.....	6	Delco.....	6	Willard....	111	6	1	S.....	CB.....		
Willys-Knight.....	20 Single	Conn.....	Hand...	A-L.....	6-8	A-L.....	6	U. S. L....	170	6	1	GI.....	GT.....	6	20
Winton.....	24 Single	Bosch.....	Hand...	Bijur.....	6	Bijur.....	6	Willard....	132	6		S.....	GT.....	6	15
Winton Six.....	25 Single	Bosch.....	Hand...	Bijur.....	6	Bijur.....	6	Willard....	125	6	1	S.....	CB.....		
Winther.....	61 Single	West.....	Hand...	West.....	6	West.....	6	Willard....	111	6		S.....	GI.....	6	10

ABBREVIATIONS: \*Starting and Lighting in closed models only. Ignition: At-K, Atwater-Kent; Conn., Connecticut; West, Westinghouse; Auto, Automatic; H & A, Hand and Automatic; S. A., Semi-Automatic. Generator: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; Ward-L, Ward-Leonard; N. E., North East; Split, Splitdorf. Motor: A-L, Auto-Lite; G & D, Gray & Davis; Leece-N, Leece-Neville; West, Westinghouse.



## Giving Ignition, Starting, Lighting, Battery, Lamp, Spark Plug and Horn Data

LAMP CANDLEPOWER, VOLTAGE AND TYPE OF BASE									SPARK PLUGS			Horn	Make and Model	
Base Contact	HEADLIGHTS		SIDELIGHTS		TAILLIGHTS		DASHLIGHT		Make	Diam. Inches	Thread Pitch			
	Volts	CP.	Volts	CP.	Volts	CP.	Volts	CP.						
20	Single	6-8	20	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Schwarze	Maibohm.....B
	Single	6-8	27	*6-8	8	6-8	2	6-8	2	A. C.	7/8	18	Sparton	Marmon.....34
20	Single	6-8	15			6-8	2	6-8	2	Champion	7/8	18	Schwarze	Maxwell.....25
	Single	6-8	21	*6-8	12	6-8	2	d6-8	2	A. C.	7/8	18	Klaxon	McFarlan.....127
10	Single	6-8	20	6-8	5	6-8	2	6-8	4	Champion	7/8	18	Sparton	Mercer.....Ser. 5
	Single	6-8		6-8		6-8		6-8		A. C.			Meteor	.....K R
10	Single	6-8	16	6-8	4	6-8	2	6-8	2	Champion	7/8	18	Trojan	Metz, Master Six....
	Single	6-8	21	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Sparton	Mitchell.....F-40
10	Single	6-8								Champion	7/8	18	Klaxon	Monitor.....
	Single	6-8	20			6-8	2	d6-8	2	Champion	7/8	18	Klaxon	Moon.....6-48
5	Single	6-8	20			6-8	2	d6-8	2	Champion	7/8	18	Klaxon	Moon.....6-68
	Double	6	20	6-8		6-8	2			Champion	7/8	18	Garford	Moore.....F
5-30	Single	6-8	15	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Trojan	Nash.....
	Double	12-16	15	*6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Sparton	National.....Series BB
10	Single	6-8				6-8		d6-8		Champion	18 m.m.		Schwarze	Nelson.....D
	Single	6-8	17			6	2	6	2	Champion	7/8	8	Stewart	Noma.....1-B
10	Single	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Schwarze	Norwalk.....4-30. KS
	Single	6	32	6		6	4	6	4	Champion	7/8	18	Klaxon	Oakland.....34-B
10	Single	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Ogren.....6-60
	Single	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Oldsmobile.....37-A
20	Single	6-8	16			3-4	2	*3-4	2	Champion	1/2		E. A. Lab.	Oldsmobile.....45-B
	Single	6-8		6-8	4	6-8	2	6-8	2	Champion	7/8	18	A. L.	Olympian.....45
10	Single	6-8	21	*6-8	4	6-8	2	6-8	4	A. C.	7/8	18	Packard Single Six....	Overland.....4
	Single	6-8	17	6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Sparton	Packard Twin Six....
20	Single	6-8	32			6-8	2	*3-4	4	A. C.	7/8	18	Paige	.....All
	Single	6-8	15	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	E. A. Lab.	Pan-American.....All
10	Single	6-8	21	6-8	4	6-8	2	6-8	2	Champion	7/8	18	Paterson	.....6-50
	Single	6-8	12			6	2	6	2	Champion	7/8	18	Sparton	Peerless.....Ser. 6
10	Single	6-8	12			6	2	6	2	Champion	7/8	18	Klaxon	Piedmont.....4-30
	Single	6-8	20			6-8	5	6-8	5	A. C.	7/8	18	Klaxon	Piedmont.....6-40
10	Single	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Pierce-Arrow.....38&48
	Single	12-16	20	12-16	4	12-16	4	12-16	2	A. C.	7/8	18	Schwarze	Pilot.....6-45
15	Double	6-8	21	*6-8	4	6-8	2	d6-8	2	A. C.	7/8	18	Stewart	Porter.....46
	Single	6-8								Bethlehem	7/8	18	Klaxon	Premier.....6
16	Single	6-8	15	6-8	4	6-8	2	6-9	2	Champion	7/8	18	Klaxon	Premo Car, 4-30&6-40
	Double	7	15			3-4	2	*3-4	2	A. C.	1/2	18	Stewart	Ranger.....A
5	Single	7	15			6	2	6	2	A. C.	1/2	18	Trojan	Reo.....T & U
	Single	6-8	20	*6-8	8	6-8	4	6-8	4	Optional	7/8	18	North East	Reo.....T6 & U6
15	Single	6-8	15	6-8	8	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Revere.....
	Single	6-8	15	6-8	8	6-8	2	6-8	2	A. C.	7/8	18	Sparton	Roamer.....6-54E
15	Single	6-8	15	6-8	4	6-8	2	d6-8	4	A. C.	7/8	18	Sparton	Roamer.....4-75E
	Single	6-8								A. C.	7/8	18	Klaxon	R & V Knight. J. & R.
20	Single	6-8	15			6-8	2	6-8	2	A. C.	7/8	18	Trojan	Saxon.....125
	Single	6-8	15			6-8	2	d6-8	2	Champion	7/8	18	Stewart	Sayers.....C. P.
20	Single	6-8	18			6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Scripps-Booth.....B
	Single	6-8	15	6-8	2	6-8	2	d6-8	2	Champion	7/8	18	Klaxon	Seneca.....L
10	Double	6	17	6	5	6	2	6	2	Champion	7/8	18	Klaxon	Severin.....H
	Single	6-8	15			6-8	2	d6-8	2	A. C.	7/8	18	Klaxon	Singer.....20
15-20	Single	6	18			6	2	6	2	Bethlehem	7/8	18	Klaxon	Skelton.....35
	Single	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Spacke.....S-20
15	Double	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Standard.....8-I
	Single	6	17	6	10	6	7	6-8	2	A. C.	7/8	18	Klaxon	Stanley.....735
20	Single	12-16	21	*12-16	4	12-16	2	12-16	2	A. C.	7/8	18	Klaxon	Stanwood.....A
	Single	6-8	15	6-8	2	6-8	2	6-8	2	Champion	7/8	18	B. & A. Lab.	Stearns.....SKL-4
20	Single	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Stevens.....80
	Single	6-8	12			6-8	2	6-8	2	Champion	7/8	18	Klaxon	Stevens-Duryea.....E
15	Double	6-8	15	*6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Sparton	Studebaker.....All
	Single	6-8								A. C.	7/8	18	Klaxon	Stutz.....H
20	Single	6-8	21	*6-8	4	6-8	2	6-8	2	Champion	7/8	18	Klaxon	Templar.....445
	Single	6	16			6	2	6-8	2	A. C.	7/8	18	Klaxon	Texas.....B38&A38
15	Single	6-8	21	6-8	2	6-8	2	d6-8	2	Champion	7/8	18	Trojan	Tulsa.....E-1,2,3
	Single	6-8	15	6-8	4	6-8	2	d6-8	2	Champion	7/8	18	E. A. Lab.	Velie.....34
15	Single	6-8	15	6-8	4	6-8	4	d6-8	4	Champion	7/8	18	Sparton	Velie.....48
	Single	6-8	21	6-8	4	6-8	2	6-8	2	A. C.	7/8	18	Klaxon	Vogue.....6-55 & 6-66
20	Single	6-8	18	*6-8	4	3-4	2	d3-4	2	A. C.	7/8	18	Klaxon	Wasp.....
	Single	6-8	30			3-4	2	*3-4	2	Champion	7/8	18	Klaxon	Westcott.....C-38&C-48
20	Single	6-8	21	6-8	6	6-8	2	6-8	2	Champion	7/8	18	Sparton	Willys-Knight.....20
	Single	6-8	21	6-8	6	6-8	2	6-8	2	Champion	7/8	18	American	Winton Six.....24
15	Single	6-8	21	6-8	6	6-8	2	6-8	2	Champion	7/8	18	Electric	Winton Six.....25
	Single	6	18			6	4	6	2	A. C.	7/8	18	Klaxon	Winther.....61

Battery: Prest-O-Lite, Prest-O-Lite. Wiring system: GI, Generator and Ignition combined; GIM, Generator, Ignition, Motor combined; S, Generator, Motor Ignition separate; GM, Generator and Motor combined. Fuses: GT, Glass Tube; Cart, Cartridge; C. B., Circuit Breaker. Lamps: \*Dashlights in series with taillights; headlight contains sidelight; d,—double contact; s,—single contact.

# From the Four Winds

## Glimpses at the World of Motordom

### COMING MOTOR EVENTS

#### Automobile Shows

New Orleans	Automobile Show	Dec. 18-24
Akron, Ohio	Automobile Show	Dec. 25-Jan. 2, 1921
New York	Highway Transportation Show	Jan. 3-8, 1921
New York	National Passenger Car Show	Jan. 8-15, 1921
Portland, Ore.	Automobile Show	Jan. 10-17, 1921
Philadelphia	Automobile Show	Jan. 15-22, 1921
Schenectady, N. Y.	Annual Automobile Show	Jan. 16-22, 1921
Milwaukee	Annual Winter Show	Jan. 17-23, 1921
Oklahoma City	Automobile Show	Jan. 17-22, 1921
Kalamazoo	Automobile Show	Jan. 18-22, 1921
San Francisco	Automotive Equipment Exposition	Jan. 22-27, 1921
Cleveland	Annual Automobile Show	Jan. 22-29, 1921
Montreal	Nat'l Motor Show of Eastern Canada	Jan. 22-29, 1921
Amsterdam, N. Y.	Annual Automobile Show	Jan. 23-29, 1921
Lawrence, Mass.	First Annual Show	Jan. 24-29, 1921
New Bedford, Mass.	Automobile Show	Jan. 25, 1921
Chicago	Automobile Salon	Jan. 29, 1921
Chicago	National Passenger Car Show	Jan. 29-Feb. 5, 1921
Hudson, N. Y.	Annual Automobile Show	Jan. 30-Feb. 5, 1921
Oakland, Calif.	Automobile Show	Jan. 31-Feb. 6, 1921
London, Ont.	National Motor Show of Western Ontario	Jan. 31-Feb. 5, 1921
Minneapolis	Winter Show	Feb. 5-12, 1921
Newberg, N. Y.	Annual Automobile Show	Feb. 6-12, 1921
Rochester, N. Y.	Automobile Show	Feb. 7-12, 1921
Kansas City, Mo.	Annual Automobile Show	Feb. 12-19, 1921
Fitchburg, Mass.	Automobile Show	Feb. 12-19, 1921
Winnipeg	Western Canada Automotive Equipment Show	Feb. 14-19, 1921
San Francisco	Automobile Show	Feb. 19-26, 1921
Pittsfield, Mass.	Annual Automobile Show	Feb. 20-26, 1921
Louisville, Ky.	Automobile Show	Feb. 21, 1921
Deadwood, S. D.	Annual Automobile Show	Feb. 21-26, 1921
Clinton, Iowa	Sixth Annual Automobile Show	Feb. 23-26, 1921
Wichita, Kan.	Annual Automobile Show	March 1-5, 1921
Des Moines	Open Car Show	March 2-5, 1921
Des Moines	Closed Car Show	March 7-10, 1921
Brooklyn	Automobile Show	March 5-12, 1921
Indianapolis	Automobile Show	March 7-12, 1921
Boston, Mass.	Annual Show	March 12-19, 1921
Greenville, S. C.	Automobile Show	March 16-19, 1921
Torrington, Conn.	Annual Automobile Show	March 20-26, 1921
Gloversville, N. Y.	Annual Automobile Show	April 3-9, 1921
Seattle	Automobile Show	April 4-9, 1921

#### Tractor Shows

Columbus, Ohio	National Tractor Show	Feb. 6-12, 1921
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#### Foreign Shows

Delhi, India	Delhi Motor Car Show	Feb. 7, 1921
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#### Conventions

New York	Automotive Service Associations	Jan. 10, 1921
Milwaukee	Wisconsin Automotive Dealers' Assn.	Jan. 19, 1921
Chicago	N. A. D. A. Annual Meeting	Jan. 31-Feb. 1, 1921
Chicago	Automotive Electric Service Association	Feb. 2-4, 1921

#### Races

Indianapolis Speedway	500 Mile Race	May 30, 1921
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### Business Notes

The B. & W. Rubber Co. recently organized and capitalized at \$500,000, will begin manufacturing rubber products shortly after the first of the year, in a factory building now nearing completion in Akron.

The Detroit branch of General Motors Acceptance Corp. has been moved to new quarters in the Durant Building, into which a number of other General Motors units have already moved.

Ford Motor Co. established records for tractor production in its plants from June to October. The combined output by months was: June, 9,149; July, 9,776; August, 10,248; September, 10,200. More than 50,000 tractors were turned out in the six months up to Aug. 18. Ford has announced that he will start operations immediately in the Imperial mine in Berea County, Mich., which was included in his recent purchase of ore and timber lands.

A complete reorganization was effected at a meeting of the officers and stockholders of Dixie Rubber Co. held at Jackson, Miss., and the way was paved for settlement of the litigation now in court which was filed by a minority of the stockholders, asking that a receiver be appointed to replace President C. L. Cadenhead.

Fisk Rubber Co. has reduced the working time of its Chicopee Falls plant from five to three days a week. About 1,800 employees are affected. The reduction is made, plant officials say, so as to provide work for as many employees as possible.

The H. H. Franklin Manufacturing Co. of Syracuse, N. Y., announces an offering of \$1,500,000 7 per cent cumulative preferred stock at par, \$100 per share. The Franklin company adopted the policy of offering its stock direct to the public in order to obtain a wide distribution. This stock is callable on sixty days notice at \$110 per share, plus accrued dividends. Two previous issues of preferred stock of this company have been retired at the premium price of \$110 per share.

D. B. Shotwell Co. have opened an additional service station at 1309 Harmon Place, Minneapolis, for carrying on automotive sheet metal work and blue flame radiator repair service as is done in their St. Paul shops.

The establishment of a large storage battery manufacturing interest in northeastern Wisconsin is presaged by the filing of articles of incorporation by the Gold Seal Storage Battery Co., with headquarters at Green Bay. It is capitalized at \$300,000.

Baldwin Service Co. has been appointed Michigan distributor for the Scoe carburetor.

At a meeting of the stockholders of the Philadelphia Nash Motor Co., Joseph C. Roberts was elected president of the corporation, H. F. Stevens vice president; W. V. Faunce treasurer, and C. D. Moody secretary and assistant treasurer. The foregoing, with F. L. Thompson, comprise the directorate. Mr. Roberts, in his capacity as president of the corporation is also majority stockholder.

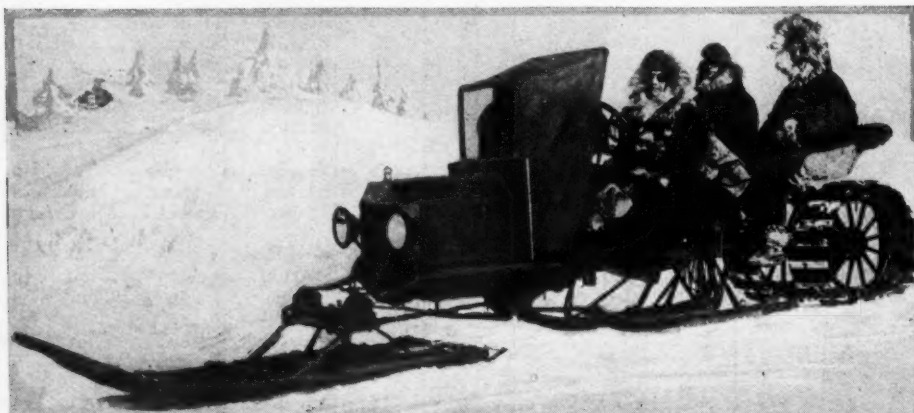
The Dearborn Garage Equipment Co., of Kalamazoo, Mich., announces an increase in its capital stock from \$100,000 to \$200,000.

The Detroit Electric Car Co., Milwaukee, has changed its corporate name to Detroit & Milburn Car Co. It is distributor of the Detroit and Milburn electrics in Wisconsin and Upper Michigan.

Hale & Kilburn Corp. directors, have approved the sale of the concern's assets to the newly organized American Motor Body Co., in exchange for 16,000 shares of Class A stock of the new company, valued at \$1,600,000 and 50,000 shares of Class B. stock of the par value of \$250,000.

The Standard Auto Equipment Co., Columbus, has opened branches in Cleveland and Cincinnati. It specializes in the manufacture of automobile equipment.

### Going to Town for Gum Drops



A type of automobile snow sled frequently seen in Alaska. This one was made by a citizen of Nome. A Ford serves to furnish the greater part of the structure. Note the lugs used on the rear wheels to obtain traction. It is claimed to be capable of high speeds and to be easy to handle.